CAMBRIDGE IGCSE BIOLOGY · 0610

BIOLOGY



EXAM QUESTION PACK

TOPIC 9: TRANSPORT IN ANIMALS

SCORE	PERCENTAGE
/	%

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Transport in animals – 2023 November IGCSE 0610

1. Nov/2023 /Paper_ 0610/11/No.18

Parts of the human circulatory system are listed.

1 arteries

2 capillaries

3 heart

4 veins

Which structures have valves to ensure the one-way flow of blood?

A 1 and 2 **B** 2 and 4 **C** 2 and 3 **D** 3 and 4

2. Nov/2023 /Paper_ 0610/13/No.18

Which human teeth are used for biting and cutting food?

A canines and molars

B incisors and canines

C molars and premolars

D premolars and incisors

3. Nov/2023 /Paper_ 0610/13/No.19

What are features of arteries?

1 narrow lumen

2 thick muscular wall

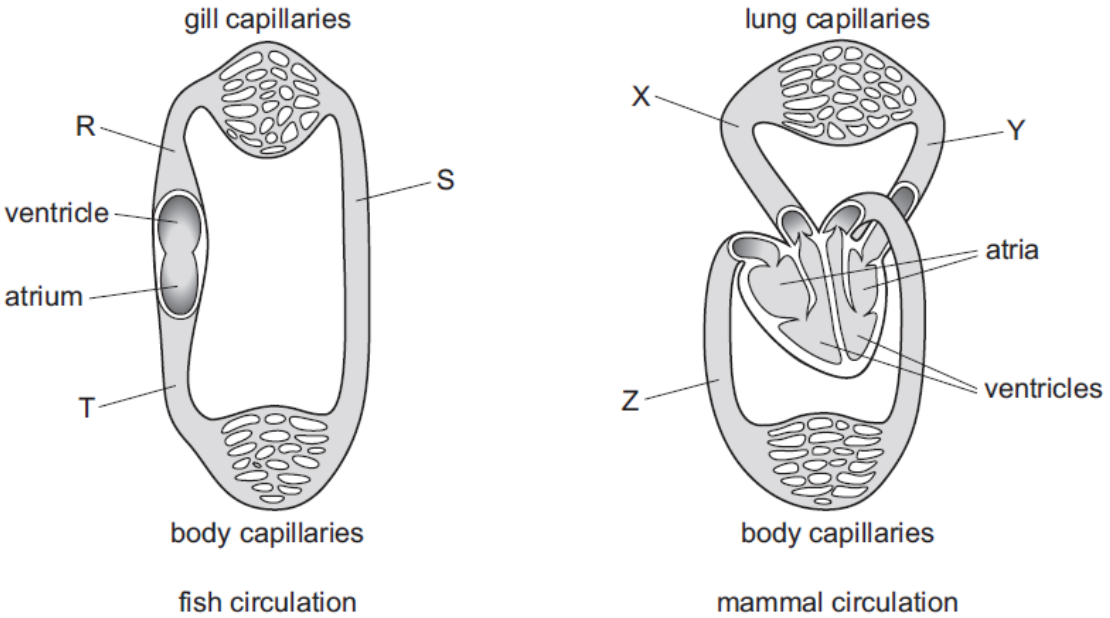
3 walls made of a single layer of cells

4 wide lumen

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

4. Nov/2023 /Paper_ 0610/21/No.18

The diagrams show the single circulation of a fish and the double circulation of a mammal.



Which letters represent areas with the most oxygenated blood?

A R and X **B** S and Y **C** T and Y **D** T and Z

5. ov/2023 /Paper_ 0610/21/No.19

What is the role of lymphocytes in the blood?

A antibody production

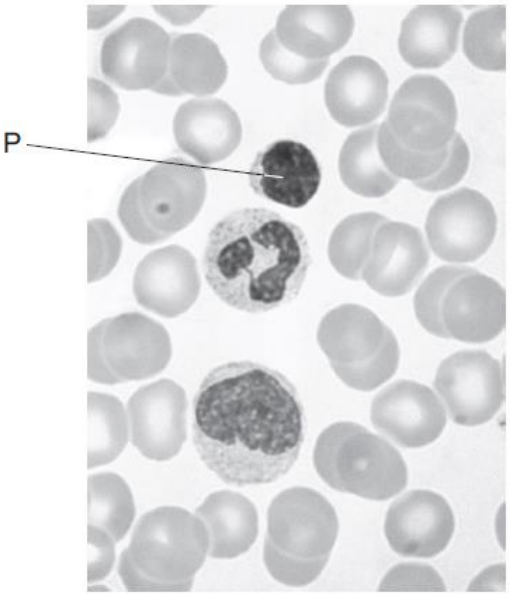
B blood clotting

C phagocytosis

D oxygen transport

6. Nov/2023 /Paper_ 0610/22/No.18

The photomicrograph shows some blood cells.



What is the function of cell P?

A It carries carbon dioxide.

B It carries oxygen.

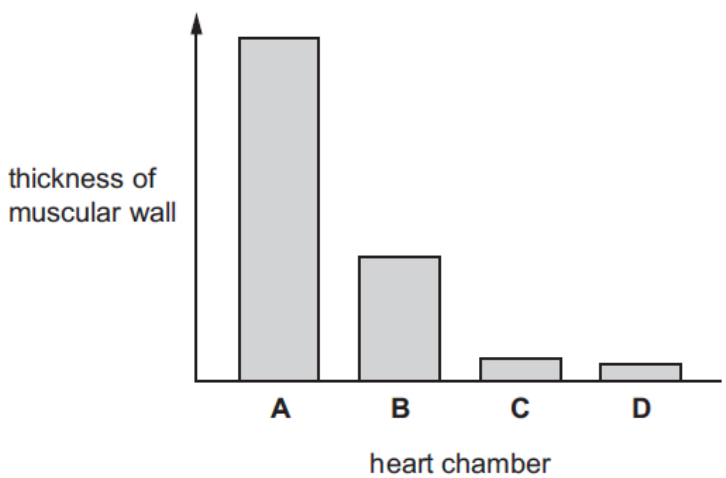
C It helps to clot blood.

D It produces antibodies.

7. Nov/2023 /Paper_ 0610/23/No.18

The graph shows the thickness of the muscular wall in each of the four chambers of the mammalian heart.

Which chamber is the right ventricle?



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8. Nov/2023 /Paper_ 0610/23/No.19

Which row shows correct features of the circulatory system of a fish?

	number of atria	number of ventricles	number of times blood flows through the heart during one circuit of the body
A	one	one	one
B	one	two	two
C	two	one	two
D	two	two	two

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9. Nov/2023 /Paper_ 0610/32/No.3

(a) Fig. 3.1 is a diagram of a cross-section of a human heart.

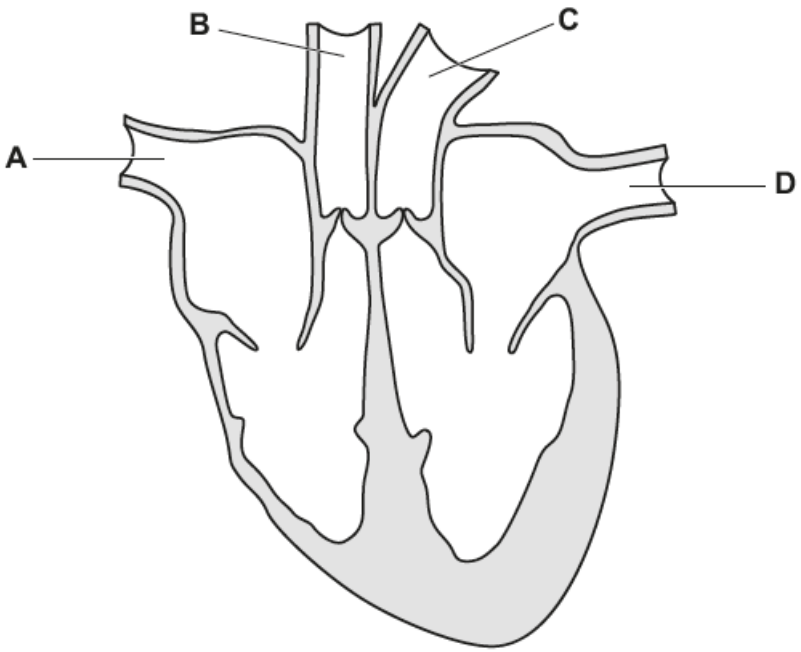


Fig. 3.1

(i) Draw an **X** on Fig. 3.1 to identify the position of the left atrium. [1]

(ii) On Fig. 3.1, label with a label line and the correct name a structure that ensures the one-way flow of blood. [2]

(iii) State **two** letters that identify arteries in Fig. 3.1.

..... and ..... [1]

(iv) State the name of the part that separates the left and right sides of the heart.

..... [1]

(v) State the name of the main tissue the wall of the heart is made from.

..... [1]

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(b) In one country, the percentages of males and females with coronary heart disease (CHD) in different age groups were recorded.

Fig. 3.2 shows these data.

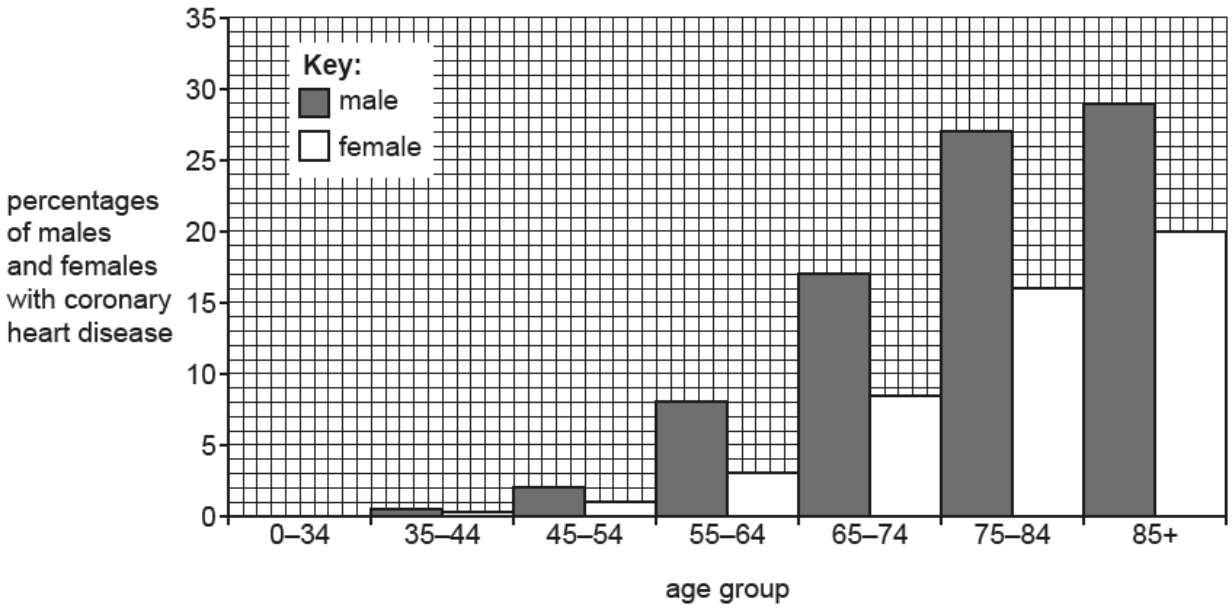


Fig. 3.2

(i) Using the information in Fig. 3.2, describe the similarities and differences between the percentages of males and females with CHD.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State **three** risk factors for CHD **not** identified in Fig. 3.2.

1 .....

2 .....

3 .....

[3]

[Total: 12]

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10. Nov/2023 /Paper_ 0610/33/No.1

(a) Arteries are a type of blood vessel.

State **two** structural features of arteries.

1 .....

2 .....

[2]

(b) Capillaries are another type of blood vessel.

State **one** function of capillaries.

.....

..... [1]

(c) State the name of the structures in veins that ensure the one-way flow of blood.

..... [1]

(d) Fig. 1.1 is a diagram of part of the human circulatory system.

The arrows show the direction of blood flow.

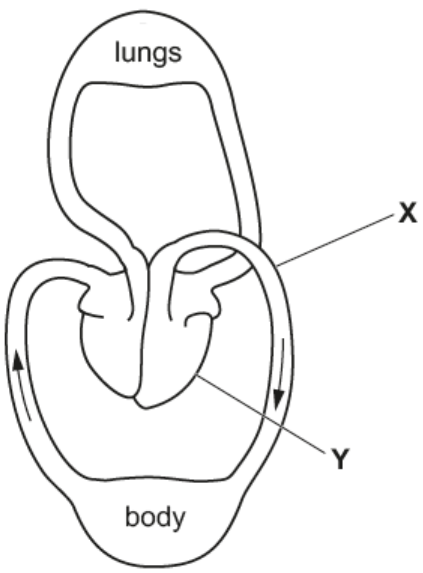


Fig. 1.1

(i) **On Fig. 1.1**, draw arrows to show the direction of blood flow to and from the lungs. [1]

(ii) State the names of blood vessel **X** and organ **Y** in Fig. 1.1.

blood vessel **X** .....

organ **Y** .....

[2]

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11. Nov/2023 /Paper_ 0610/42/No.1

(a) Red blood cells are specialised cells that transport oxygen.

State the substance in red blood cells that combines with oxygen.

..... [1]

(b) State the name of the component of blood that promotes blood clotting.

..... [1]

(c) Some students investigated the effect of immersing red blood cells in different concentrations of salt solution.

They measured the diameters of samples of red blood cells and calculated the mean.

They then immersed each red blood cell sample in a different concentration of salt solution.

After two minutes they measured and calculated the mean of the samples again.

Table 1.1 shows the results.

Table 1.1

percentage concentration of the salt solution	mean initial diameter of the red blood cells / μm	mean diameter of the red blood cells after two minutes / μm
0.4	7.5	cells burst
0.8	7.5	8.2
0.9	7.5	7.5
1.8	7.5	6.0

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(i) Calculate the percentage increase in the mean diameter of red blood cells that were immersed in the 0.8% salt solution.

Give your answer to **two** significant figures.

Space for working.

..... %
[3]

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(ii) Explain the results for the red blood cells that were immersed in the 1.8% salt solution.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) State why there was no change in the mean diameter of the red blood cells immersed in the 0.9% salt solution.

.....

.....

..... [1]

(d) State why red blood cells burst when immersed in pure water but plant cells do not.

.....

.....

..... [1]

(e) State **two** uses of water in a plant.

1 .....

2 .....

[2]

[Total: 12]

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12. Nov/2023 /Paper_ 0610/42/No.5

(a) Describe **two** ways in which the circulatory system of a fish is different from the circulatory system of a mammal.

1 .....

.....

2 .....

.....

[2]

(b) Explain the advantages of a double circulatory system.

.....

.....

.....

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.....

.....

..... [3]

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(c) Fig. 5.1 shows part of the circulatory system of a mammal.

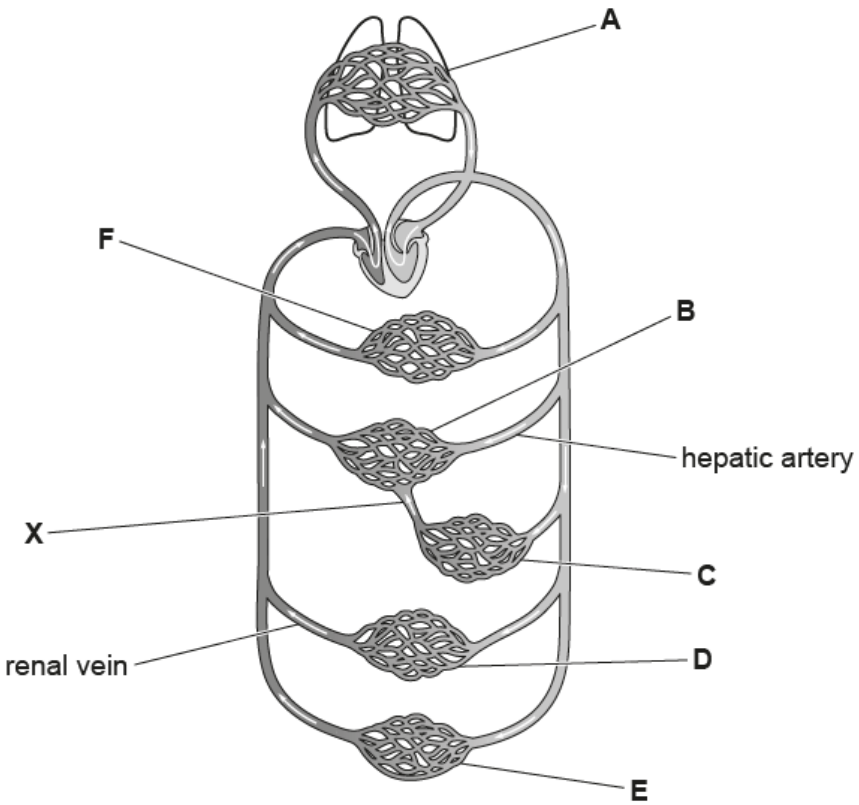


Fig. 5.1

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(i) State the letter from Fig. 5.1 that identifies where these processes occur:

absorption of the products of digestion into the blood .....

excretion of carbon dioxide from the body .....

formation of urine .....

production of bile. .....

[4]

(ii) Identify the name of the blood vessel labelled **X** in Fig. 5.1.

..... [1]

(d) Describe the role of the liver in excretion.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 14]

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Transport in animals – 2023 June IGCSE Biology 0610

1. June/2023/Paper_0610/11/No.19

Which statements describe how the structures in the circulatory system function?

1 a muscular pump to push blood into vessels

2 valves to ensure one-way blood flow

3 veins to take blood away from the heart

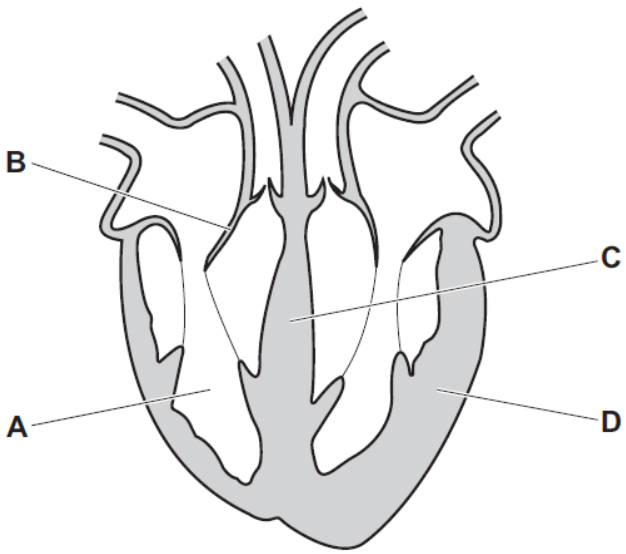
4 vessels to return blood to the heart

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

2. June/2023/Paper_0610/11,22/No.20,18

The diagram shows a section through the heart.

Which part is the septum?

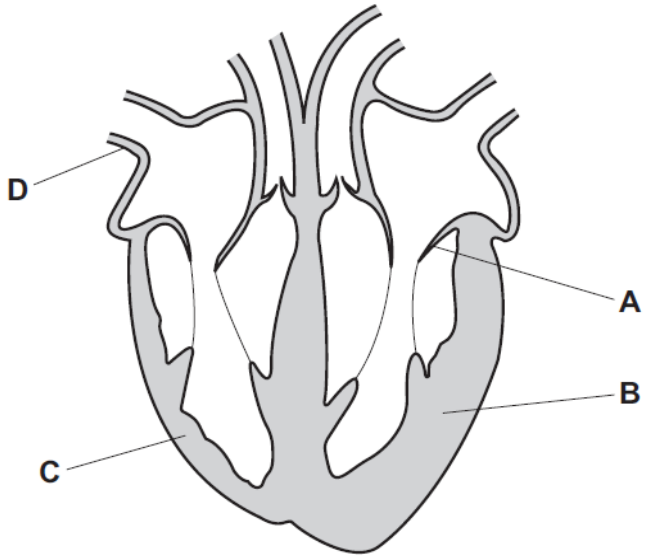


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3. June/2023/Paper_0610/12,22/No.19,17

The diagram shows the human heart.

Which label shows the left ventricle?



4. June/2023/Paper_0610/12/No.20

Which row shows the features of an artery or a vein?

	blood vessel	diameter of lumen	thickness of wall
A	artery	large	thick
B	artery	small	thin
C	vein	large	thin
D	vein	small	thick

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5. June/2023/Paper_0610/13/No.19

The cholera bacterium toxin causes dehydration and loss of salts from the blood in humans.

Which statement explains the reason for this?

A Chloride ions are secreted into the small intestine where they increase the water potential.

B Chloride ions are secreted into the small intestine which causes water to move into the intestine by osmosis.

C Chloride ions are secreted into the small intestine which causes water to move out of the intestine by osmosis.

D Chloride ions are secreted into the small intestine which causes the water potential of the blood to decrease.

6. June/2023/Paper_0610/13/No.20

During inspiration, the processes listed take place.

P volume of the thorax increases

Q air rushes into the lungs

R pressure in the thorax decreases

S external intercostal muscles contract

T diaphragm moves down, ribs move upwards and outwards

What is the correct sequence for these processes?

A Q → P → S → R → T

B S → T → P → R → Q

C Q → P → S → T → R

D S → Q → R → P → T

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7. June/2023/Paper_0610/21/No.17

Which statements describe how the structures in the circulatory system function?

1 a muscular pump to push blood into vessels

2 valves to ensure one-way blood flow

3 veins to take blood away from the heart

4 vessels to return blood to the heart

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

8. June/2023/Paper_0610/22/No.18

Which row shows the features of an artery or a vein?

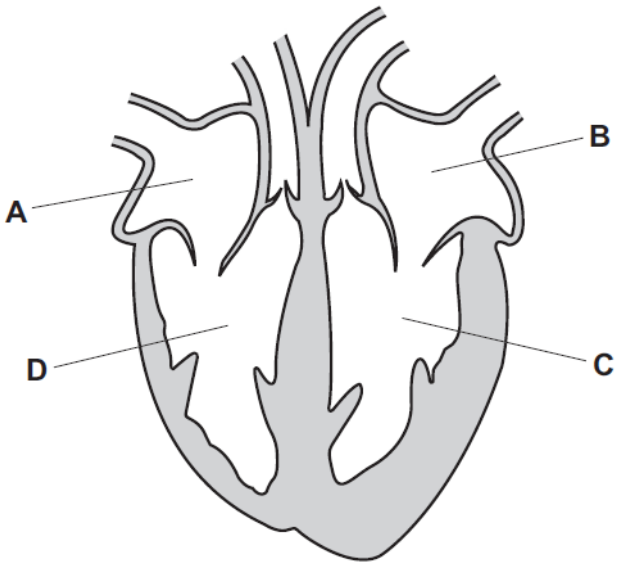
	blood vessel	diameter of lumen	thickness of wall
A	artery	large	thick
B	artery	small	thin
C	vein	large	thin
D	vein	small	thick

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9. June/2023/Paper_0610/23/No.17

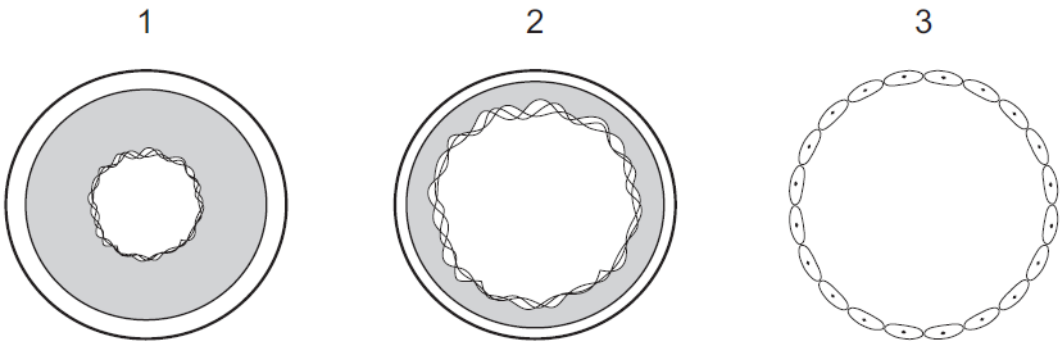
The diagram shows a section of the human heart.

Which label identifies the right ventricle?



10. June/2023/Paper_0610/23/No.18

The diagrams show sections through three types of blood vessel. They are **not** drawn to the same scale.



In which order will red blood cells flow through these vessels in the human body when travelling from the aorta to the right atrium of the heart?

A $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 3 \rightarrow 1$ **D** $3 \rightarrow 1 \rightarrow 2$

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11. June/2023/Paper_0610/31/No.3

Fig. 3.1 is a photomicrograph of a sample of human blood.

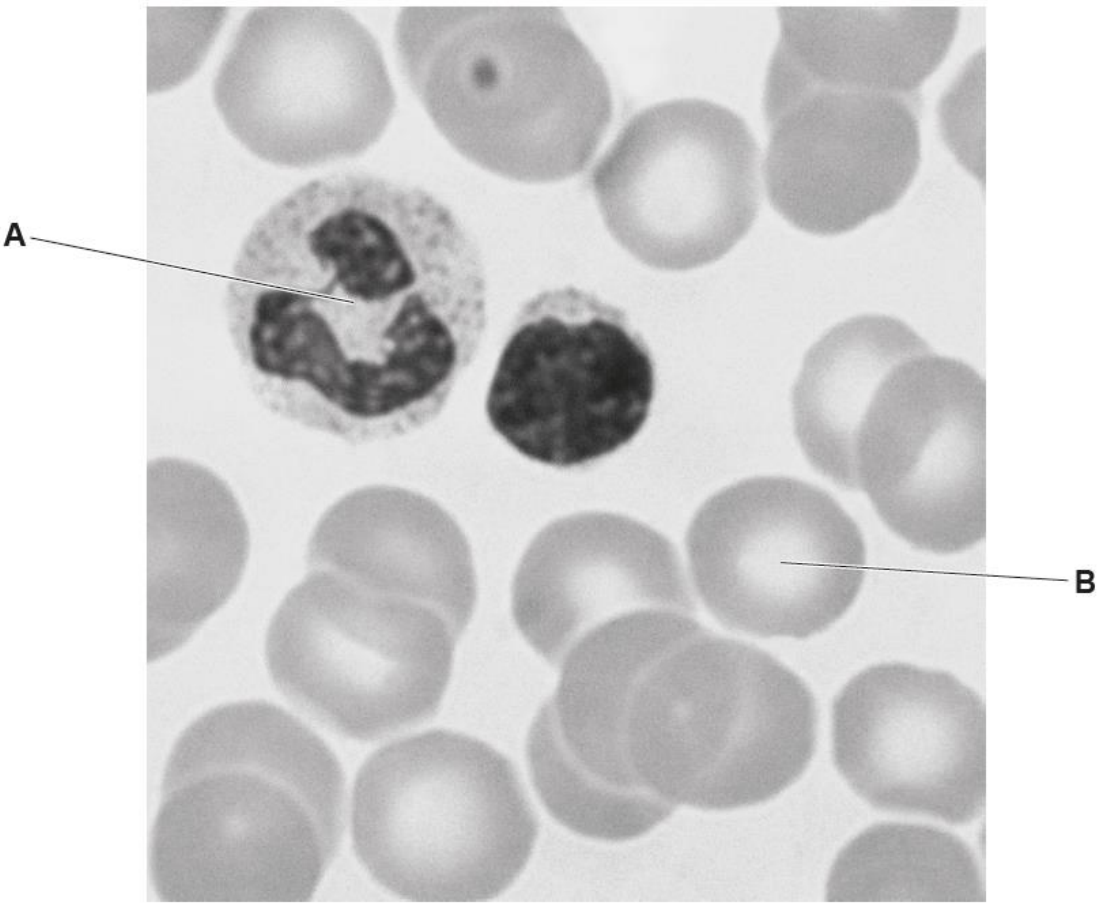


Fig. 3.1

(a) Identify and describe the functions of the cells labelled **A and B** in Fig. 3.1.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

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(b) Describe how platelets in the blood prevent disease.

.....

.....

.....

.....

..... [2]

(c) Blood plasma transports many substances including excretory products and hormones.

(i) (Circle) the names of **two** excretory products in humans.

amino acids **cellulose** **carbon dioxide** **glucose**

lipase **oxygen** **urea**

[2]

(ii) State the names of **two** hormones that are produced by the reproductive organs.

1 .....

2 .....

[2]

[Total: 10]

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(a) Complete the sentences about the circulatory system.

The heart ..... blood around the body.

Blood is carried away from the heart in blood vessels called ..... .

Blood is carried to the heart in blood vessels called ..... .

Nutrients are delivered to cells by blood vessels called ..... .

One-way flow of blood is ensured by the presence of ..... .

[5]

(b) Fig. 4.1 shows ECG traces of the activity of a student's heart.

An ECG trace was produced while the student was at rest and while the student was exercising.

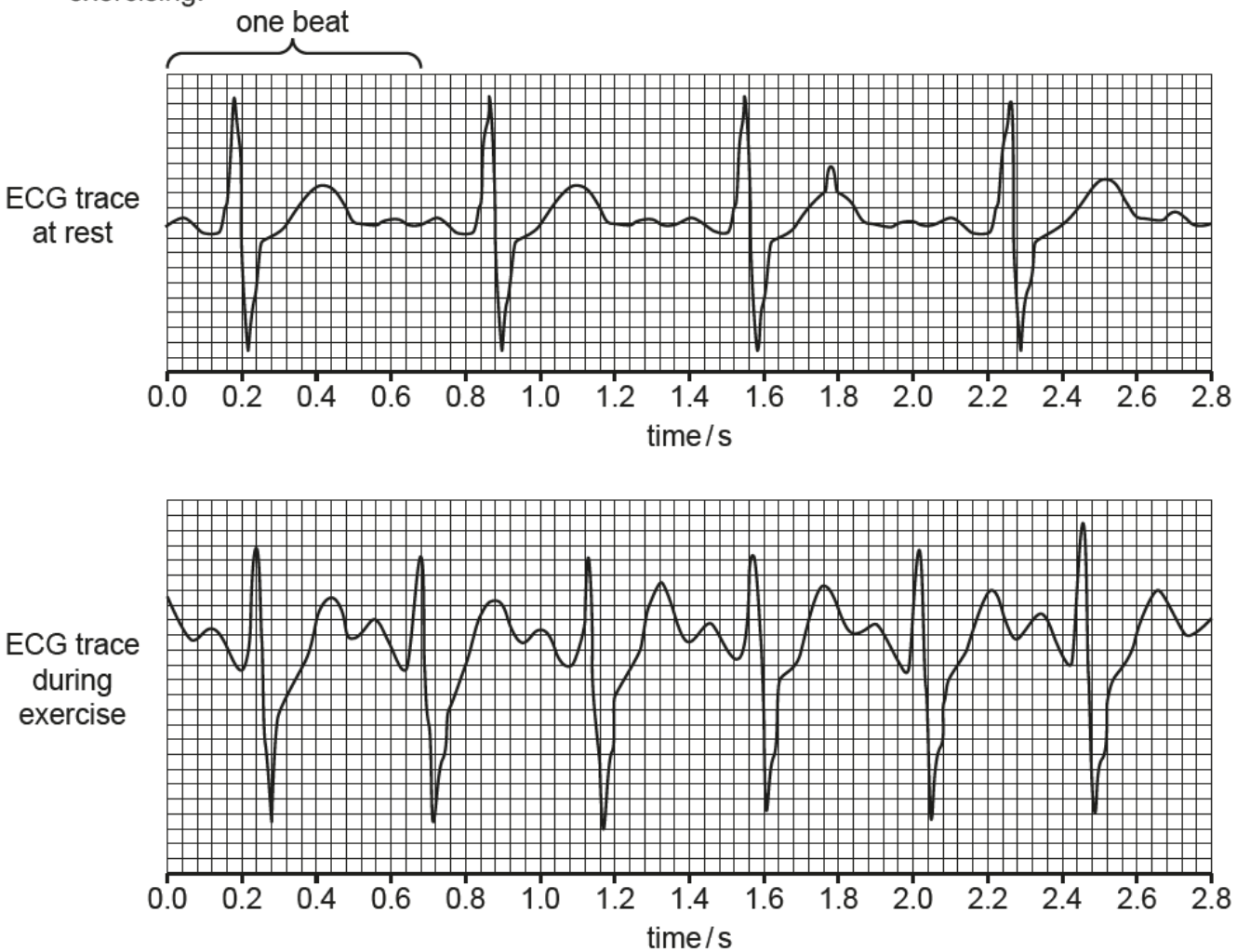


Fig. 4.1

The ECG trace shows the number of heart beats in 2.8 seconds.

There were four heart beats in 2.8 seconds at rest.

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(i) State the number of heart beats in 2.8 seconds during exercise.

..... [1]

(ii) Calculate the percentage **increase** in heart beats between at rest and during exercise.

Space for working.

.....% [1]

(c) Regular exercise reduces the risk of developing coronary heart disease (CHD).

Describe other ways of reducing a person's risk of developing coronary heart disease.

.....

.....

.....

.....

.....

.....

..... [3]

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(d) Fig. 4.2 shows a stethoscope which is used to listen to the heart.



Fig. 4.2

State the cause of the heart sounds detected by the stethoscope.

.....

.....

..... [1]

[Total: 11]

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13. June/2023/Paper_0610/43/No.3

Fig. 3.1 is a diagram of a section through a human heart.

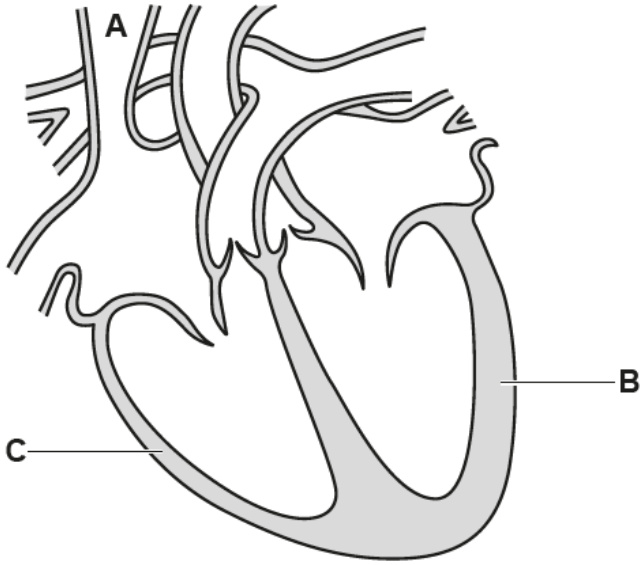


Fig. 3.1

(a) Draw an **X** on the septum in Fig. 3.1. [1]

(b) Explain the reason for the difference between the thickness of the walls at **B** and at **C** in Fig. 3.1.

.....

.....

.....

.....

..... [2]

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(c) A red blood cell enters the vena cava at **A** in Fig. 3.1.

Explain how the red blood cell is moved from the vena cava to the aorta.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

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(d) An athlete measured her heart rate during a running race. She recorded it before the race, during the race and during her recovery.

Her results are shown in Fig. 3.2.

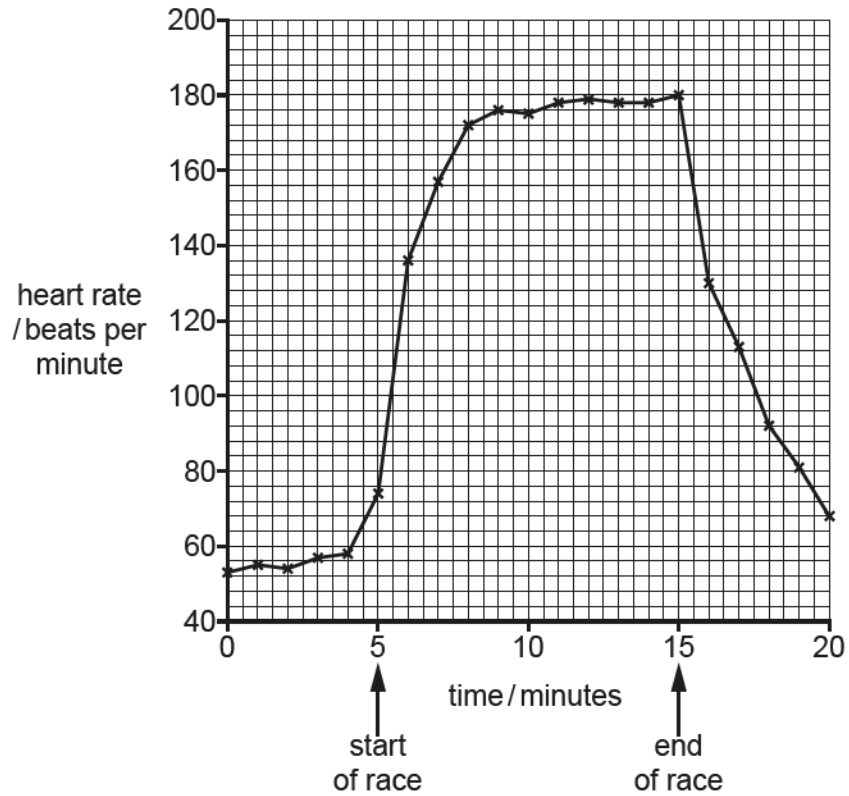


Fig. 3.2

(i) Suggest how the athlete could monitor the activity of her heart.

.....

.....

..... [1]

(ii) Calculate the percentage change in heart rate from the maximum heart rate reached during the race until the heart rate recorded at 18 minutes.

Give your answer to **three** significant figures.

Space for working.

..... %
[3]

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(iii) Explain why heart rate must increase during exercise.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 16]

14. March/2023/Paper_ 0610/12/No.19

Which row about the circulatory system is correct?

	part that pumps blood	part with valves
A	heart	heart and veins
B	heart and blood vessels	all blood vessels
C	capillaries	heart
D	heart	capillaries and arteries

15. March/2023/Paper_ 0610/12/No.20

Which structures may become blocked in coronary heart disease?

A arteries

B atria

C veins

D ventricles

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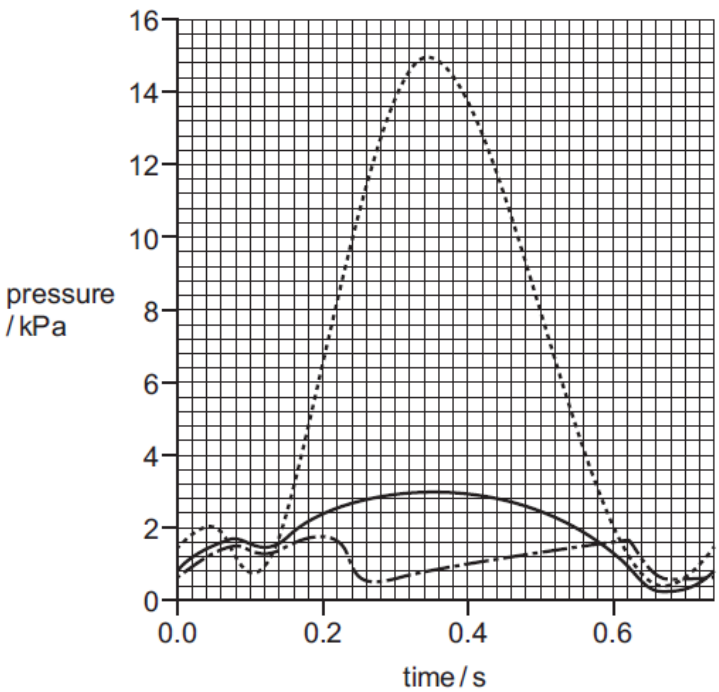
16. March/2023/Paper_ 0610/22/No.17

Which row about the circulatory system is correct?

	part that pumps blood	part with valves
A	heart	heart and veins
B	heart and blood vessels	all blood vessels
C	capillaries	heart
D	heart	capillaries and arteries

17. March/2023/Paper_ 0610/22/No.18

The graph shows pressure changes that take place in the right atrium, right ventricle and left ventricle of a human heart when the muscle walls contract and relax.



What is the pressure in the right ventricle when the left ventricle is at its maximum pressure?

A 0.4 kPa **B** 2.0 kPa **C** 3.0 kPa **D** 15.0 kPa

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18. March/2023/Paper_ 0610/42/No.1

(a) Fig. 1.1 is a simplified diagram of the circulatory system in humans.

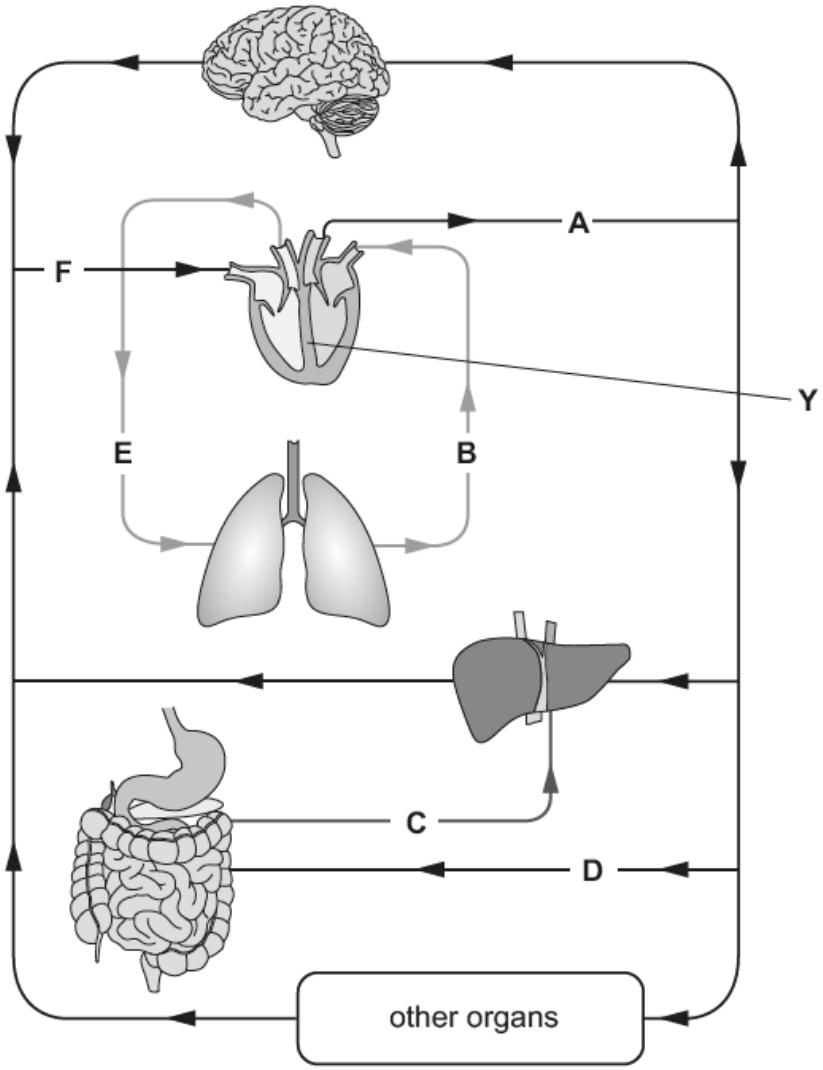


Fig. 1.1

(i) State the letter from Fig. 1.1 that represents the blood vessel that contains blood with the highest concentration of oxygen.

..... [1]

(ii) State the letter from Fig. 1.1 that represents the hepatic portal vein.

..... [1]

(iii) State all the letters from Fig. 1.1 that represent arteries.

..... [1]

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(iv) Explain the importance of the part labelled **Y** in Fig. 1.1.

.....

.....

.....

.....

..... [2]

(v) State the evidence from Fig. 1.1 that the diagram shows a double circulation system.

.....

.....

.....

.....

..... [2]

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(b) Fig. 1.2 shows the pressure of blood flowing through different blood vessels as it travels around the body. (Venules are narrow vessels that connect capillaries to veins.)

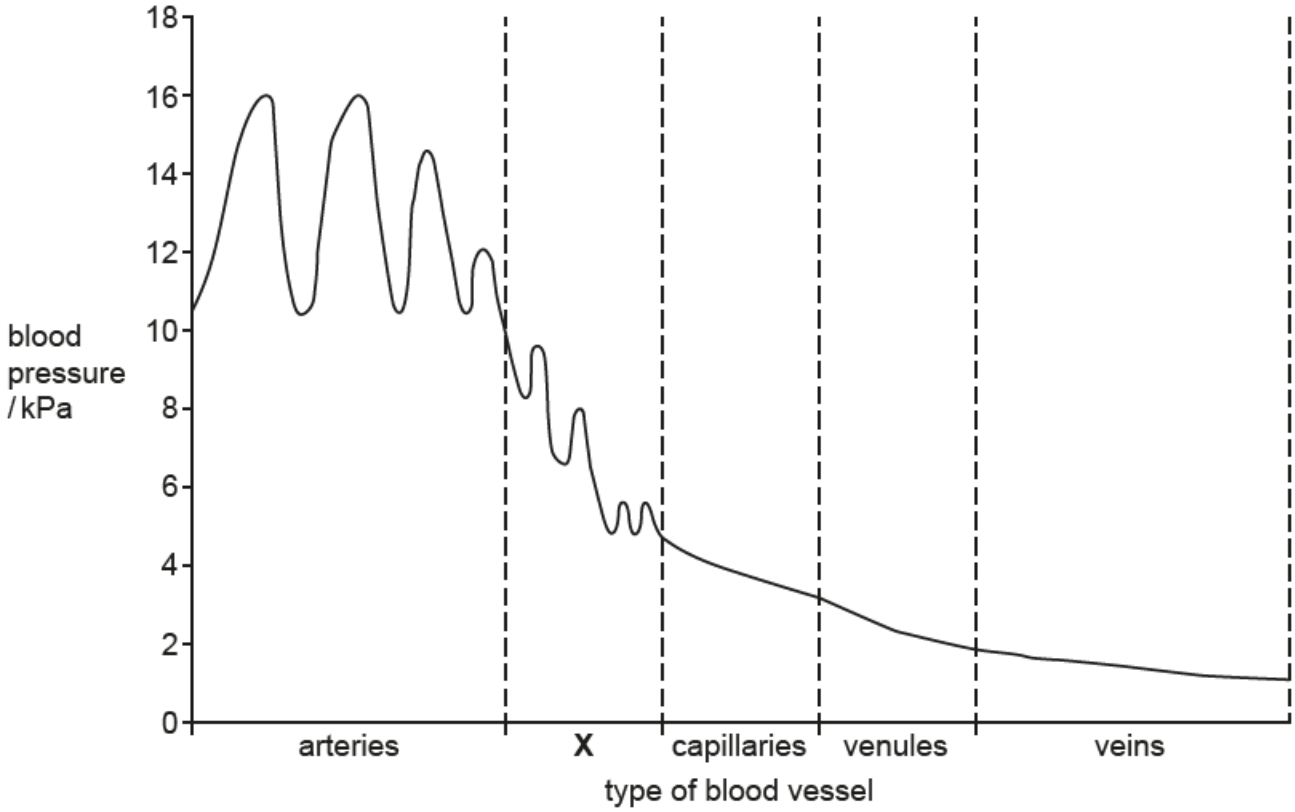


Fig. 1.2

(i) Blood vessels **X** in Fig. 1.2 supply blood to skin-surface capillaries and have a role in maintaining a constant internal temperature.

State the name of the blood vessels that are represented by the letter **X** in Fig. 1.2.

..... [1]

(ii) Explain reasons for the changes in pressure seen in the **arteries** in Fig. 1.2.

.....

.....

.....

.....

..... [2]

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(iii) Using the information in Fig. 1.2, explain the structural adaptations of arteries **and** veins.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 14]

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Transport in animals – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.18

Which process occurs during transpiration?

A evaporation of water from the xylem

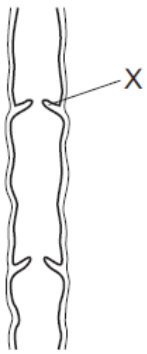
B loss of water by osmosis from the guard cells

C movement of water vapour through the spongy mesophyll by active transport

D movement of water vapour through the stomata by diffusion

2. Nov/2022/Paper_11/No.20

The diagram shows a section of a human vein.



What is the function of the part labelled X?

A to make sure the blood flows to the heart

B to make sure the blood flows to the kidneys

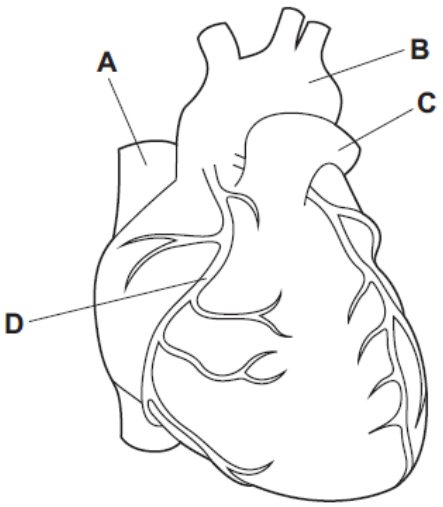
C to make sure the blood flows to the brain

D to make sure the blood flows to the lungs

3. Nov/2022/Paper_12/No.19

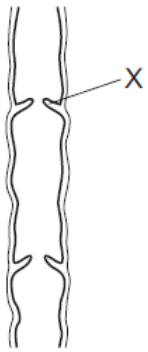
The diagram shows the outside of a human heart.

Which structure is a coronary artery?



4. Nov/2022/Paper_12/No.20

The diagram shows a section of a human vein.



What is the function of the part labelled X?

A to make sure the blood flows to the heart

B to make sure the blood flows to the kidneys

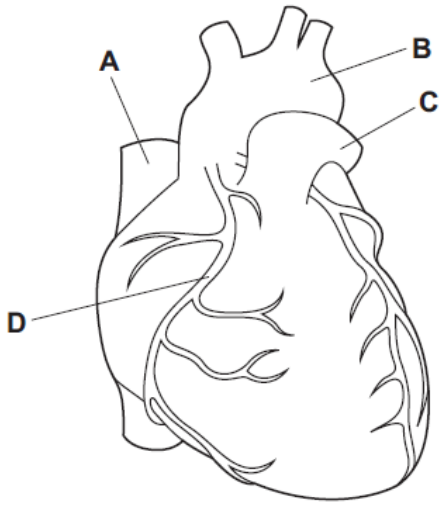
C to make sure the blood flows to the brain

D to make sure the blood flows to the lungs

5. Nov/2022/Paper_13/No.19

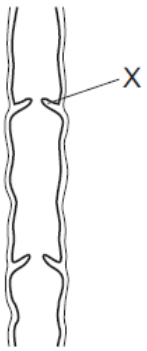
The diagram shows the outside of a human heart.

Which structure is a coronary artery?



6. Nov/2022/Paper_13/No.20

The diagram shows a section of a human vein.



What is the function of the part labelled X?

A to make sure the blood flows to the heart

B to make sure the blood flows to the kidneys

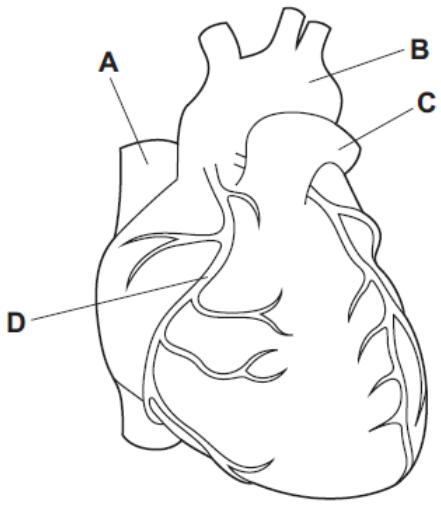
C to make sure the blood flows to the brain

D to make sure the blood flows to the lungs

7. Nov/2022/Paper_21/No.17

The diagram shows the outside of a human heart.

Which structure is a coronary artery?



8. Nov/2022/Paper_21/No.18

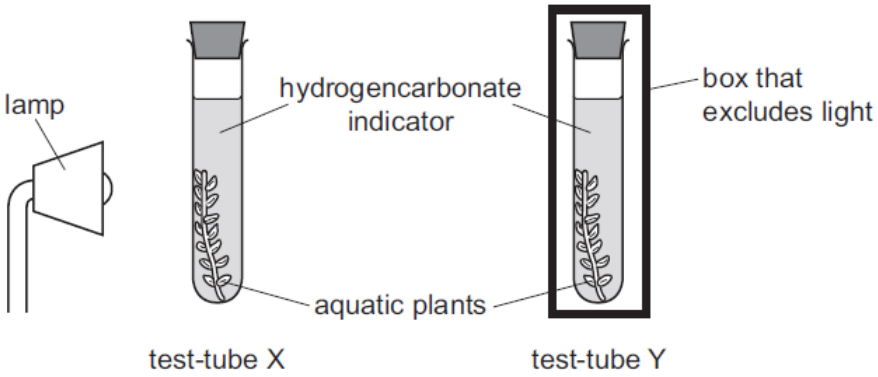
What happens in the heart when blood flows from the atria to the ventricles?

	atria muscles	atrioventricular valves	ventricle muscles
A	contract	close	relax
B	contract	open	relax
C	relax	close	contract
D	relax	open	contract

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9. Nov/2022/Paper_23/No.11

Two test-tubes were filled with hydrogencarbonate indicator. An aquatic plant was placed into each test-tube and the test-tubes were sealed with bungs, as shown.



Test-tube X was illuminated and test-tube Y was kept in the dark. The results are shown.

test-tube	colour of the hydrogencarbonate indicator	
	at the start of the investigation	at the end of the investigation
X	orange	red
Y	orange	yellow

What causes the colour changes in the hydrogencarbonate indicator in X and Y?

	X	Y
A	a decrease in the concentration of carbon dioxide	an increase in the concentration of carbon dioxide
B	a decrease in the concentration of oxygen	an increase in the concentration of oxygen
C	an increase in the concentration of carbon dioxide	a decrease in the concentration of carbon dioxide
D	an increase in the concentration of oxygen	a decrease in the concentration of oxygen

10. Nov/2022/Paper_23/No.12

The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

C glucose

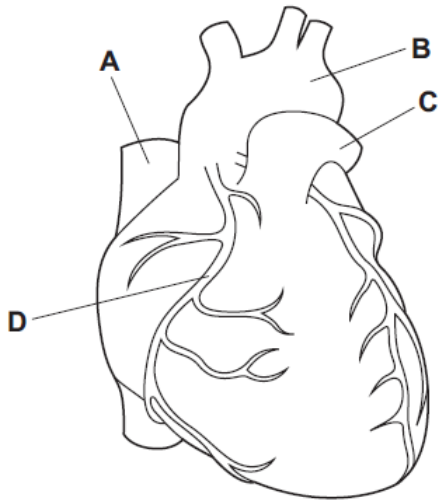
D mineral ions

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11. Nov/2022/Paper_23/No.17

The diagram shows the outside of a human heart.

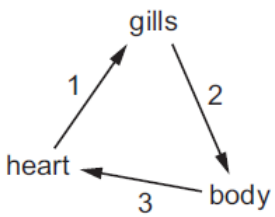
Which structure is a coronary artery?



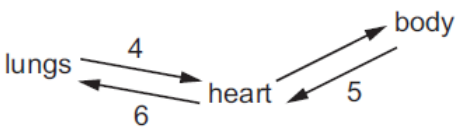
12. Nov/2022/Paper_23/No.18

The diagrams represent blood flow in the circulatory systems of fish and humans.

fish circulation



human circulation



In the fish circulation and the human circulation, where is the oxygen concentration highest?

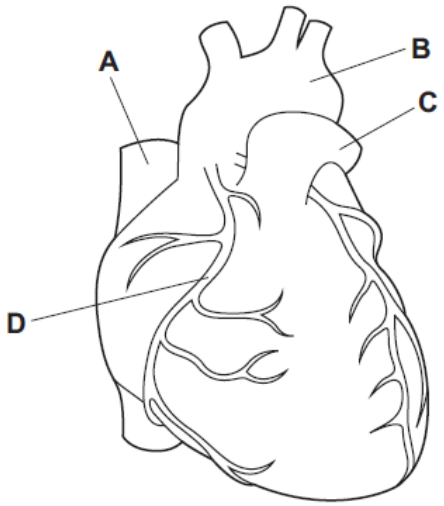
	fish circulation	human circulation
A	1	4
B	1	5
C	2	4
D	3	6

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13. Nov/2022/Paper_22/No.17

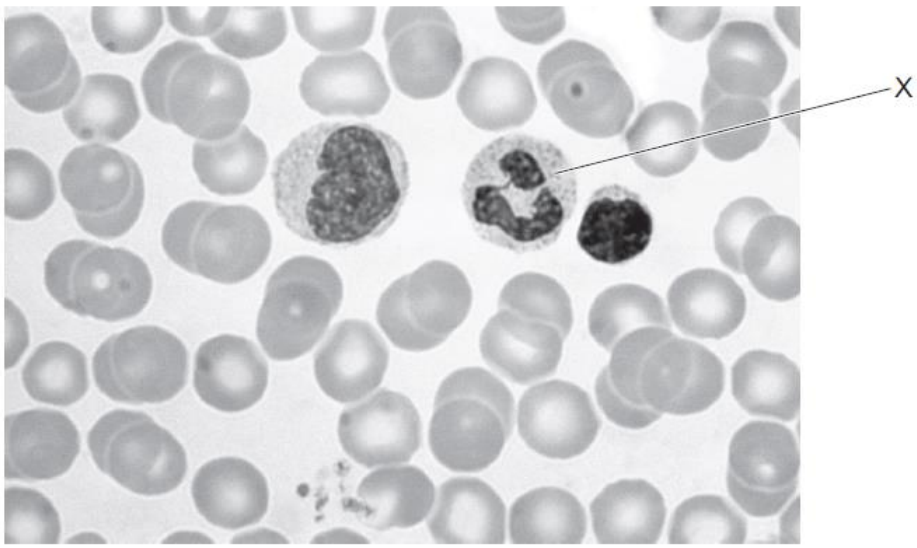
The diagram shows the outside of a human heart.

Which structure is a coronary artery?



14. Nov/2022/Paper_23/No.18

The photomicrograph shows some different types of blood cell.



What is the function of the cell labelled X?

A clotting blood

B phagocytosis

C producing antibodies

D transporting oxygen

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15. Nov/2022/Paper_32/No.2(a)

(a) Fig. 2.1 is a photomicrograph of human blood.

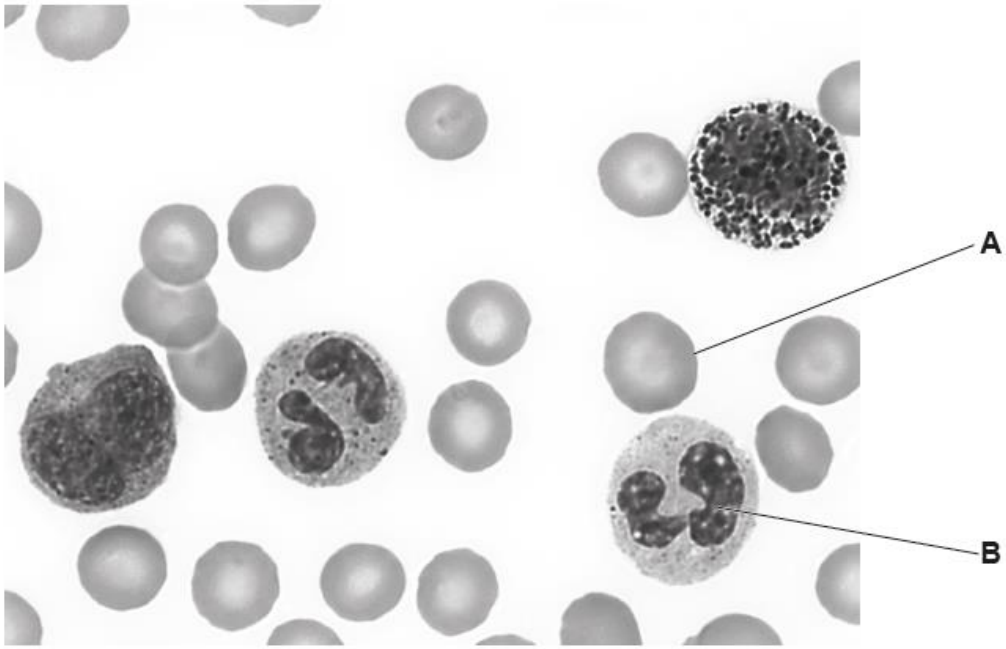


Fig. 2.1

(i) Use the information in Fig. 2.1 to complete Table 2.1 by stating **one** function for each cell.

Table 2.1

identifying letter in Fig. 2.1	function
A	
B	

[2]

(ii) State the name of the component of blood that transports the cells shown in Fig. 2.1.

..... [1]

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16. Nov/2022/Paper_33/No.6

Fig. 6.1 is a diagram of a section through a human heart.

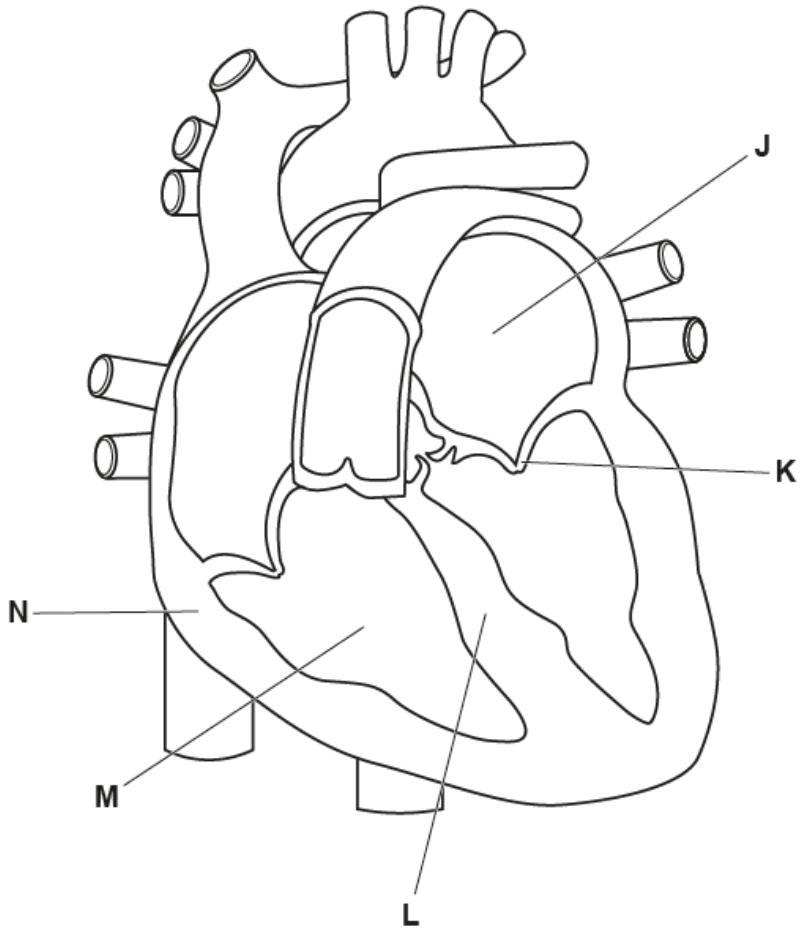


Fig. 6.1

(a) (i) Complete the table to identify the labelled structures in the heart shown in Fig. 6.1.

structure	letter in Fig. 6.1
one-way valve	
	L
muscular wall	
ventricle	
atrium	

[5]

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(a) Fig. 6.1 shows diagrams of the circulatory systems of a fish and a mammal.

The arrows show the direction of blood flow through the circulatory systems.

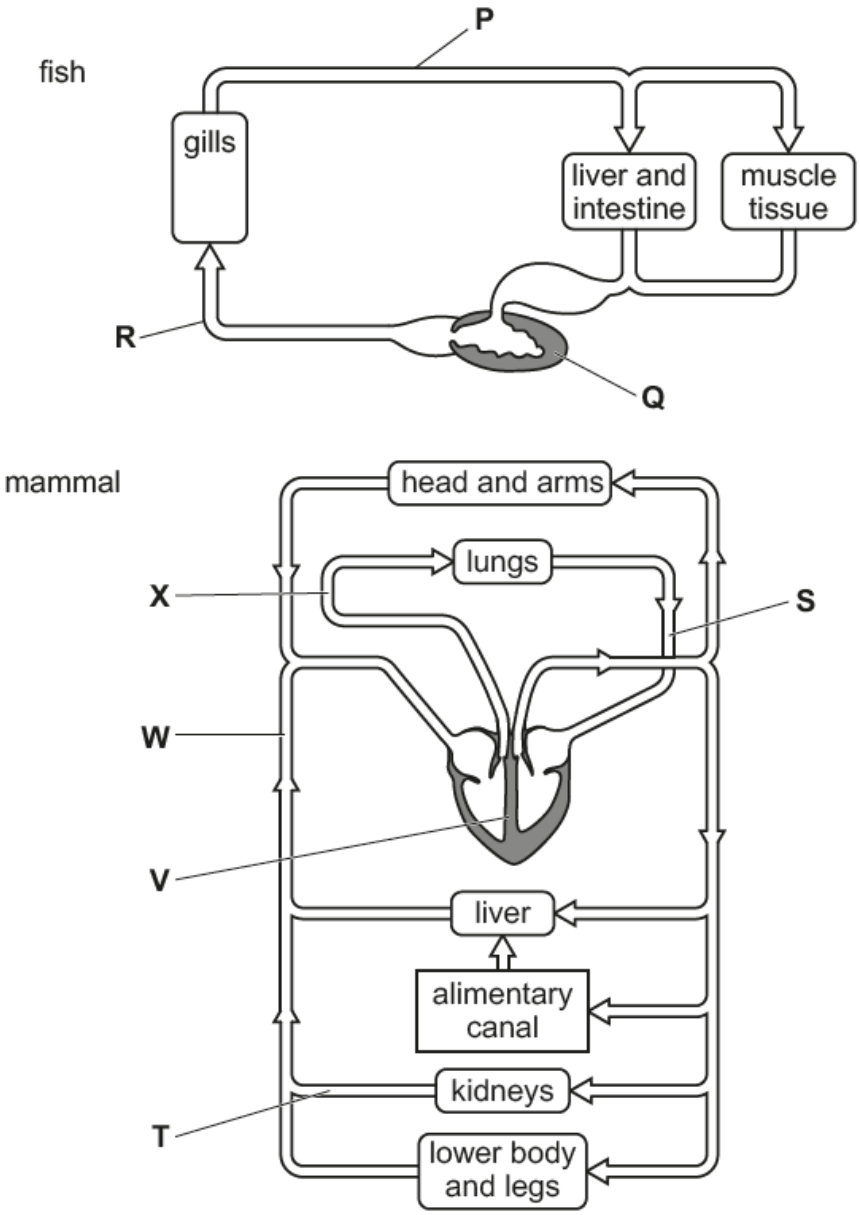


Fig. 6.1

(i) State the names of the structures labelled **Q**, **T**, **W** and **X**.

Q .....

T .....

W .....

X .....

[4]

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(ii) State the name of structure **V** on Fig. 6.1 **and** describe its function.

.....

.....

.....

.....

..... [2]

(iii) Fig. 6.1 shows that fish and mammals have different types of circulation.

State why the fish circulation is called a single circulation.

.....

.....

..... [1]

(iv) Explain the advantages of the double circulation of the mammal.

.....

.....

.....

.....

.....

.....

..... [3]

(b) The blood vessels that supply the heart muscle can become blocked.

(i) State the name of the blood vessels that supply the heart muscle.

..... [1]

(ii) State **one** way in which blockages in these blood vessels can be treated.

..... [1]

18. Nov/2022/Paper_42/No.6

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(c) Substances move between blood and tissues at various sites in the circulatory system of mammals.

(i) Oxygen is absorbed into the blood as it passes through the lungs.

State the structures in the lungs where oxygen passes into the blood from the air.

..... [1]

(ii) State the site of filtration of blood in the kidneys.

..... [1]

(iii) State the name of the process in which products of digestion move into cells and are used to become part of the cells.

..... [1]

(iv) State the name of the process in which excess amino acids are broken down in liver cells to produce ammonia.

..... [1]

(v) State the name of the organ that releases oestrogen into the blood.

..... [1]

[Total: 17]

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19. Nov/2022/Paper_43/No.4

(a) Fig. 4.1 shows a dandelion plant, *Taraxacum officinale*, in a field. The flower stalk is called a scape.



Fig. 4.1

(i) The scape of a dandelion responds to sunlight by growing upwards.

State the name of this growth response.

..... [1]

(ii) The scapes of dandelions keep the plant upright without the need for structures such as bones.

Explain how cells in plant scapes and stems keep plants upright.

.....

.....

.....

.....

..... [2]

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(b) Fig. 4.2 is part of a cross-section through the scape of a dandelion.

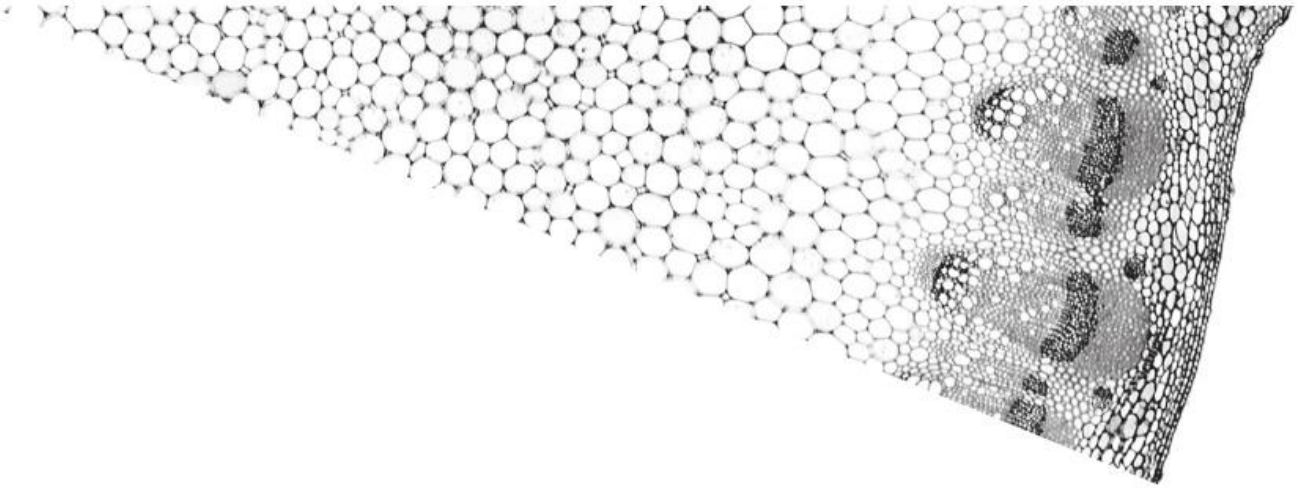


Fig. 4.2

Draw a line and add a label **on Fig. 4.2** to identify one area of **xylem** tissue. [1]

(c) Describe the function of **phloem** tissue.

.....

.....

.....

.....

.....

.....

..... [3]

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(d) A dandelion scape was cut into long strips for an osmosis investigation.

Immediately after the scape was cut, the pieces of scape bent outwards, as shown in Fig. 4.3.

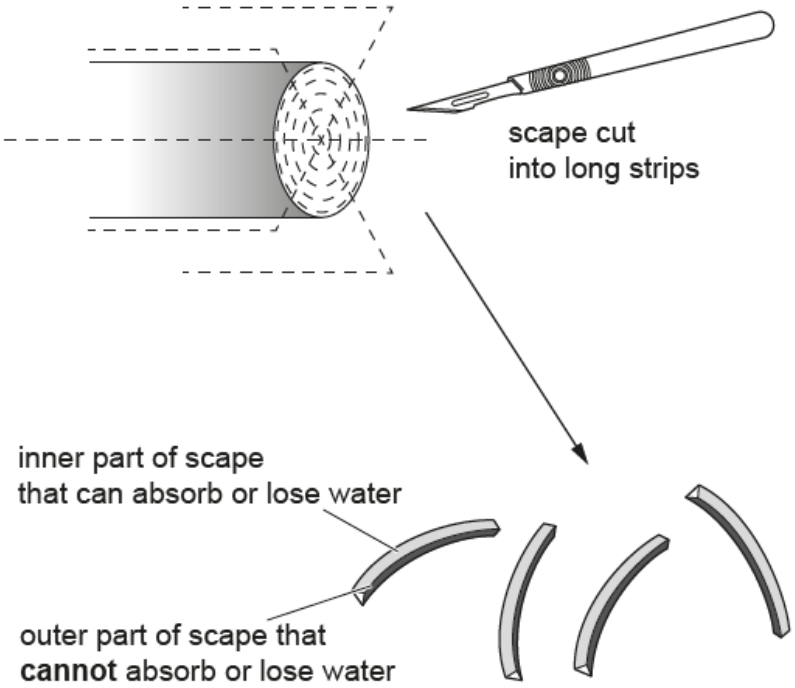


Fig. 4.3

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Strips of dandelion scape were placed in four dishes, **A**, **B**, **C** and **D**, for 30 minutes.

Each dish contained a different concentration of salt solution.

Fig. 4.4 shows the appearance of the four strips of scape after 30 minutes.

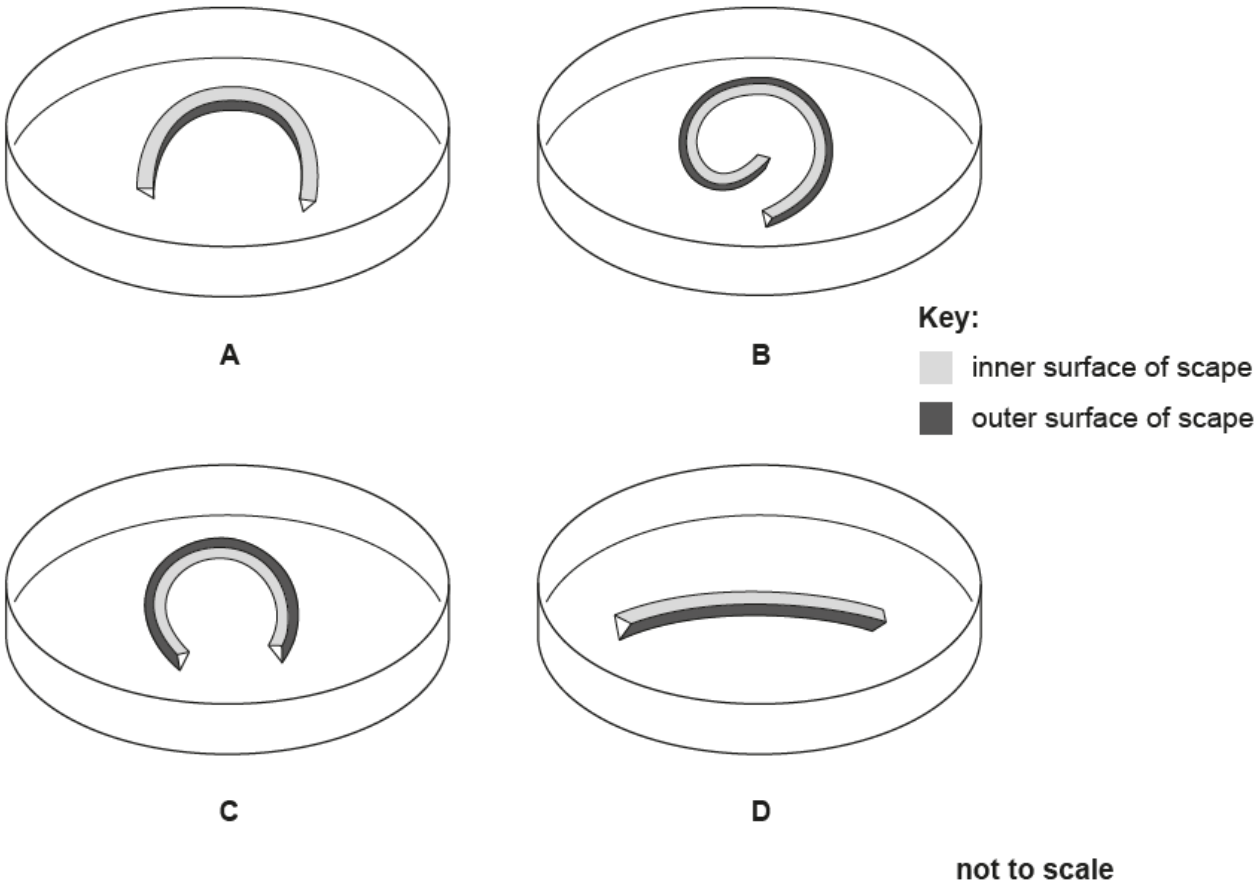


Fig. 4.4

Using the information in Fig. 4.3 and Fig. 4.4, deduce and explain which strip of scape was in the most concentrated salt solution.

strip of scape .....

explanation .....

.....

.....

.....

.....

[3]

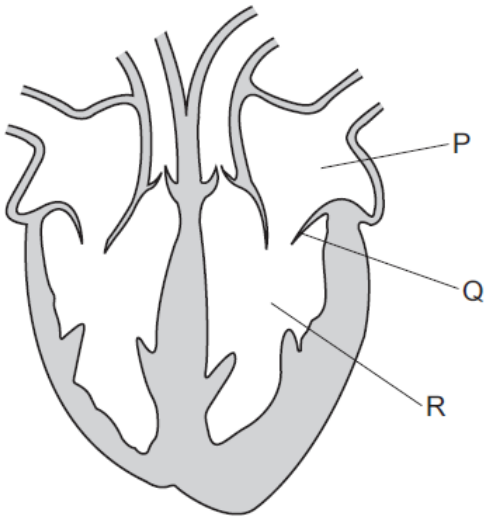
[Total: 10]

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Transport in animals – 2022 June IGCSE 0610

1. June/2022/Paper_ 11/No.19

The diagram shows a cross-section through the heart of a mammal.



Which row correctly identifies P, Q and R?

	P	Q	R
A	valve	right atrium	right ventricle
B	left atrium	valve	left ventricle
C	left ventricle	left atrium	valve
D	right atrium	valve	right ventricle

2. June/2022/Paper_ 11/No.20

Which process is slower than normal in a person with very few platelets?

A antibody formation

B blood clotting

C oxygen transport

D phagocytosis

3. June/2022/Paper_ 12/No.5

The table shows some structures found in the human body.

Which row shows the correct level of organisation, from the simplest structure to the most complex?

	simple	→		complex
A	red blood cell	heart	heart muscle	circulatory system
B	heart muscle	circulatory system	red blood cell	heart
C	red blood cell	heart muscle	heart	circulatory system
D	heart muscle	red blood cell	circulatory system	heart

4. June/2022/Paper_ 12/No.19

Which row correctly links the blood vessels with their functions?

	carries blood to the right atrium from the body	carries blood from the right ventricle to the lungs	carries blood from the lungs to the left atrium	carries blood from the left ventricle to the body
A	vena cava	pulmonary artery	pulmonary vein	aorta
B	aorta	pulmonary vein	pulmonary artery	vena cava
C	aorta	pulmonary artery	pulmonary vein	vena cava
D	vena cava	pulmonary vein	pulmonary artery	aorta

5. June/2022/Paper_ 12/No.20

Which process is slower than normal in a person with very few platelets?

A antibody formation

B blood clotting

C oxygen transport

D phagocytosis

6. June/2022/Paper_ 13/No.20

Which process is slower than normal in a person with very few platelets?

A antibody formation

B blood clotting

C oxygen transport

D phagocytosis

7. June/2022/Paper_ 21/No.18

What is a function of the lymphatic system?

A absorption of glucose

B blood clotting

C circulation of body fluids

D temperature regulation

8. June/2022/Paper_ 23/No.17

In a double circulation, what is the role of the right side of the heart?

A to receive oxygenated blood from the body and to pump oxygenated blood to the lungs

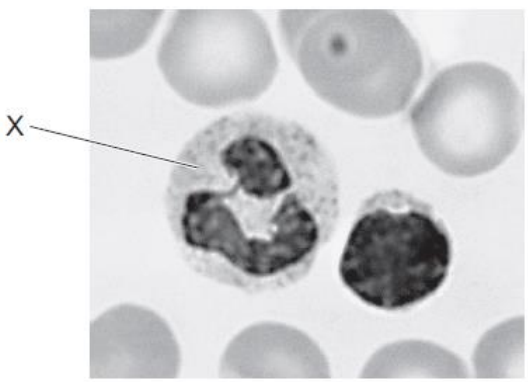
B to receive oxygenated blood from the body and to pump deoxygenated blood to the lungs

C to receive deoxygenated blood from the body and to pump oxygenated blood to the lungs

D to receive deoxygenated blood from the body and to pump deoxygenated blood to the lungs

9. June/2022/Paper_ 23/No.18

The photomicrograph shows some human blood cells.



What is the name of cell X and what is its function?

	name	function
A	lymphocyte	produces antibodies
B	lymphocyte	engulfs pathogens
C	phagocyte	produces antibodies
D	phagocyte	engulfs pathogens

10. June/2022/Paper_ 32/No.1(a_ c)

(a) Blood group is inherited. There are four human blood groups: A, B, AB and O.

Surveys were carried out in two different countries to find out the percentage of the population in each blood group.

The results are shown in Fig. 5.1.

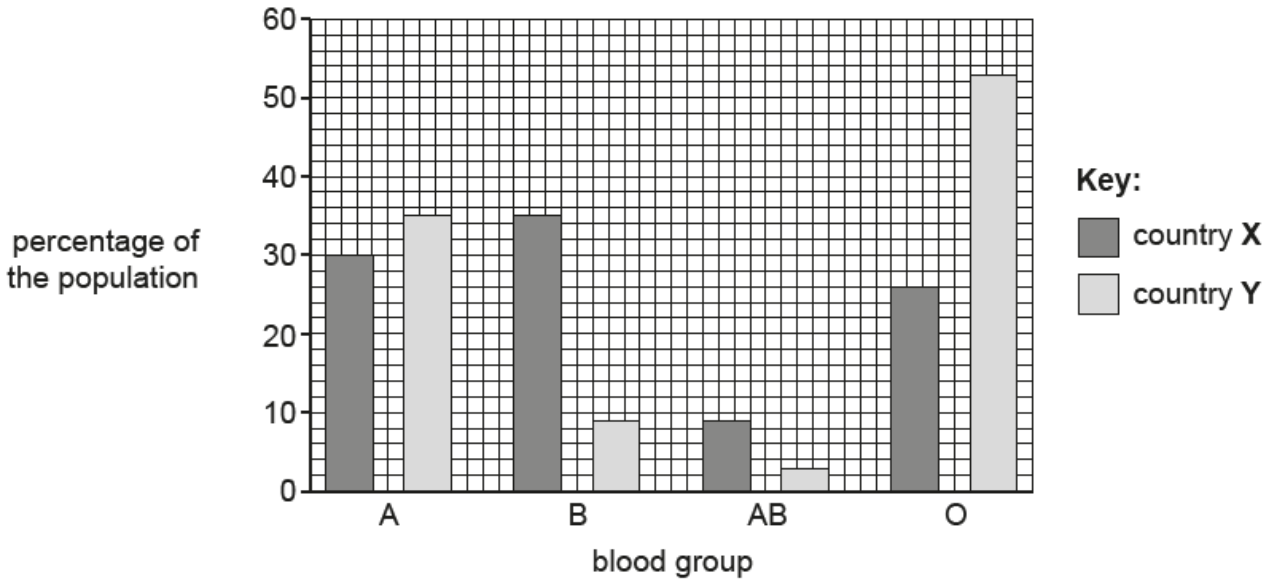


Fig. 5.1

(i) Complete the sentences that describe the data shown in Fig. 5.1.

The rarest blood group in both countries is ..... .

In country **X** blood group ..... is the most common but in country **Y** it is blood group ..... .

The percentage of the population of country **X** that has blood group **A** is .....%.
[4]

(ii) Suggest the type of variation shown in Fig. 5.1 and give a reason for your choice.

type of variation .....

reason .....

.....

.....
[2]

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11. June/2022/Paper_ 33/No.1(a_ b)

The human circulatory system contains blood vessels.

(a) Fig. 1.1 shows some names of blood vessels and organs.

The boxes on the left show the names of some blood vessels that deliver blood to organs.

The boxes on the right show the names of some organs that receive blood.

Draw straight lines from each blood vessel to the organ that it delivers blood to.

Draw **four** straight lines.

blood vessel that delivers blood	**organ receiving blood**
pulmonary artery	heart
pulmonary vein	kidney
renal artery	lungs
vena cava	

Fig. 1.1

[4]

(b) Table 1.1 shows three types of blood vessel, the thickness of their walls and whether they contain valves.

Complete the descriptions of the blood vessels in Table 1.1.

Table 1.1

type of blood vessel	thickness of wall	presence of valves
artery	thick	no
capillary		
vein		

[4]

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12. June/2022/Paper_ 41/No.2(a_ b)

Mammals have a double circulation.

Fig. 2.1 is a diagram of a section through the heart of a mammal. The arrows show the direction of blood flow through the heart and blood vessels.

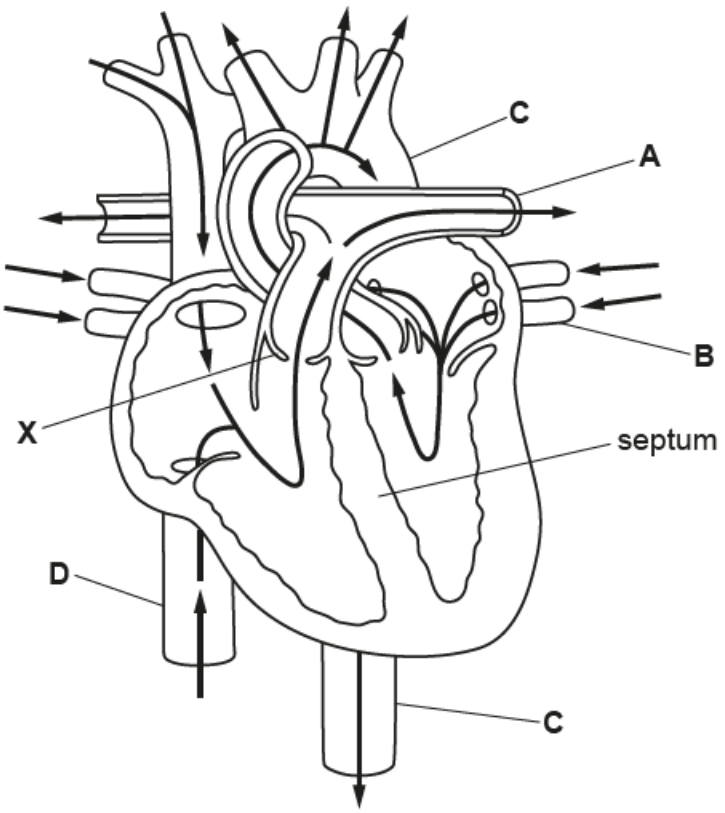


Fig. 2.1

(a) (i) State the name of the chamber of the heart with the thickest wall.

..... [1]

(ii) **D** is a vein. State the name of this vein and describe its structure.

name .....

description of structure .....

.....

.....

.....

.....

.....

[3]

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(iii) Identify the structure labelled **X** in Fig. 2.1 **and** state its role in the heart.

.....

.....

.....

.....

..... [2]

(b) Fig. 2.2 is a diagram that shows the double circulation of a mammal. The arrows indicate the movement of oxygen and carbon dioxide in and out of the blood.

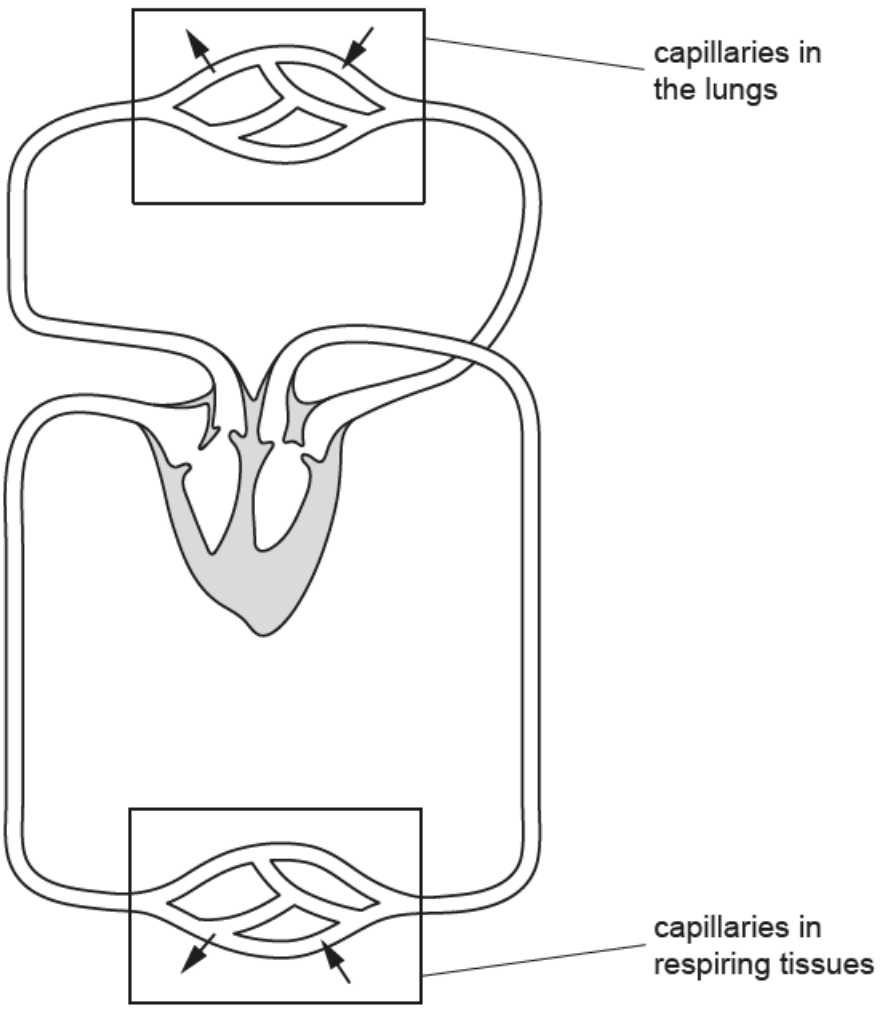


Fig. 2.2

(i) Shade the blood vessel in Fig. 2.2 that transports blood with the highest oxygen concentration. [1]

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(ii) Describe the evidence shown in Fig. 2.2 that the mammal has a double circulatory system.

.....

.....

.....

.....

..... [2]

(iii) Explain the advantages of a double circulation.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

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13. June/2022/Paper_ 42/No.1(c_ e)

(c) Carbon dioxide is a raw material for photosynthesis.

(i) State the process by which carbon dioxide travels into the leaf from the air.

..... [1]

(ii) Describe the pathway taken by a molecule of carbon dioxide, from the air outside a leaf to a spongy mesophyll cell.

.....

.....

.....

.....

..... [2]

(d) Low concentrations of carbon dioxide in the air may restrict the rate of photosynthesis in plants.

(i) State the term given to something present in the environment in such short supply that it restricts life processes.

..... [1]

(ii) State **one** other feature of the environment that may also restrict the rate of photosynthesis.

..... [1]

(e) Researchers have devised a process of artificial photosynthesis. They use gold nanoparticles as a catalyst to utilise green light to convert carbon dioxide to fuels, such as propane.

Suggest the advantages to the environment of using artificial photosynthesis on a large scale.

.....

.....

.....

.....

..... [2]

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14. June/2022/Paper_ 43/No.2(a_ b)

Red blood cells contain the protein haemoglobin.

(a) **(i)** State the names of the **four** chemical elements that are found in all proteins.

.....

..... [2]

(ii) State the role of haemoglobin.

.....

.....

..... [1]

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(b) Fig. 2.1 shows a photomicrograph of some red blood cells from a person with sickle cell anaemia.

Abnormal red blood cells occur because of a mutation in the gene for haemoglobin.

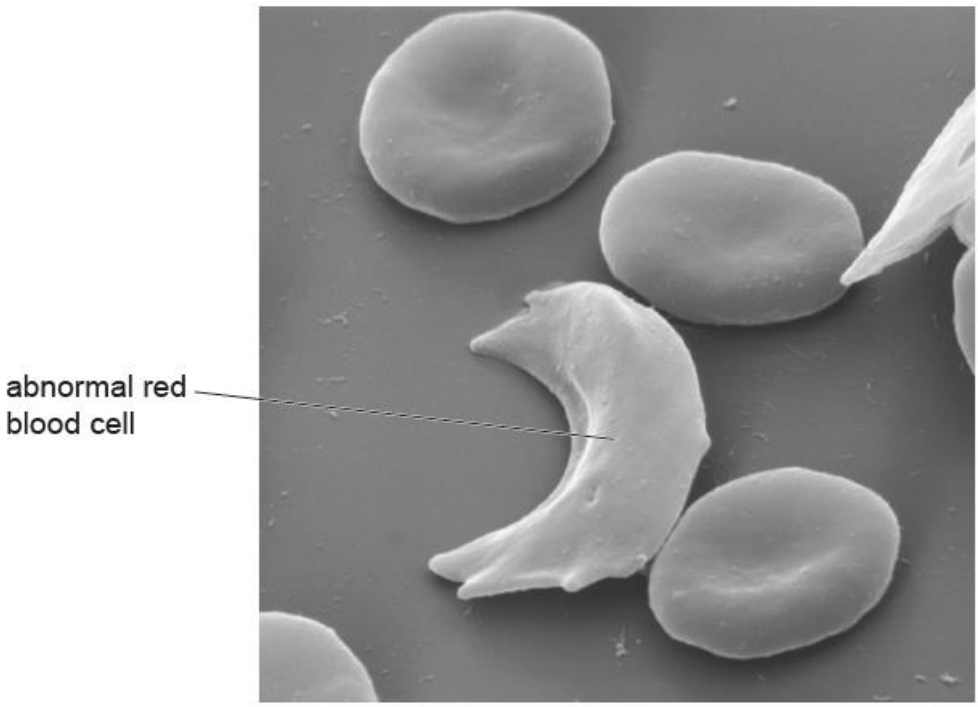


Fig. 2.1

Suggest how the shape of the abnormal red blood cell shown in Fig. 2.1 will affect blood flow.

.....

.....

.....

.....

..... [2]

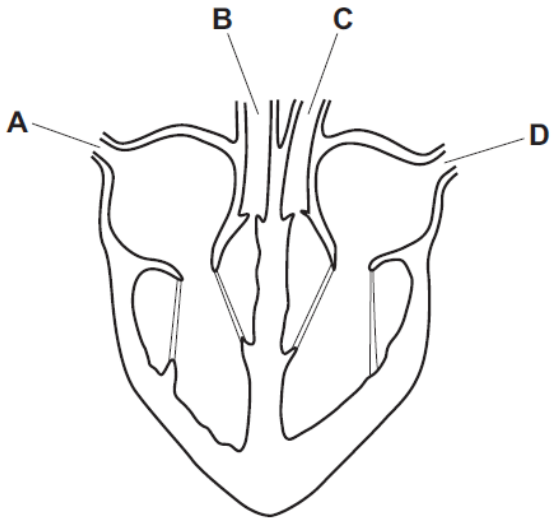
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Transport in animals – 2021 IGCSE 0610

1. Nov/2021/Paper_11/No.19

The diagram shows a section through a mammalian heart.

Which part carries blood directly from the lungs?



2. Nov/2021/Paper_11/No.20

Which component of blood produces antibodies?

A red blood cells

B white blood cells

C platelets

D plasma

3. Nov/2021/Paper_12/No.19

What do shunt vessels connect?

A arterioles to capillaries

B arterioles to venules

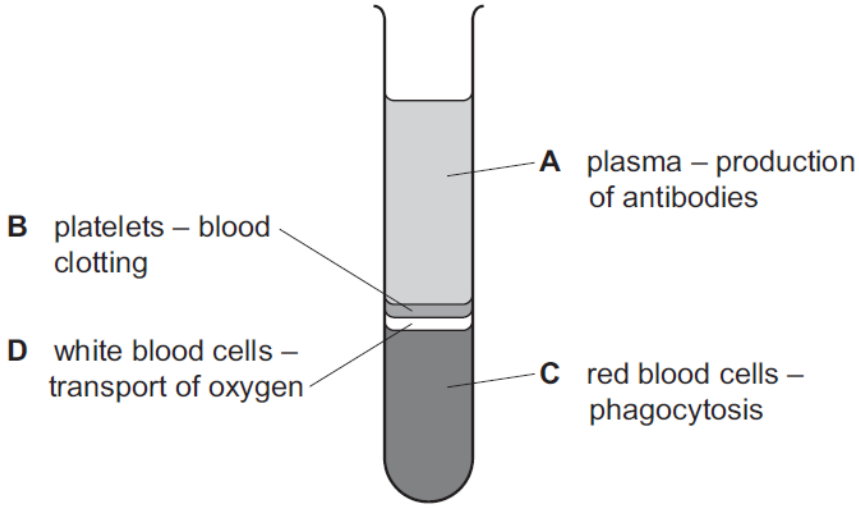
C capillaries to lymphatic vessels

D capillaries to venules

4. Nov/2021/Paper_12/No.20

The diagram shows the four components of blood separated into layers.

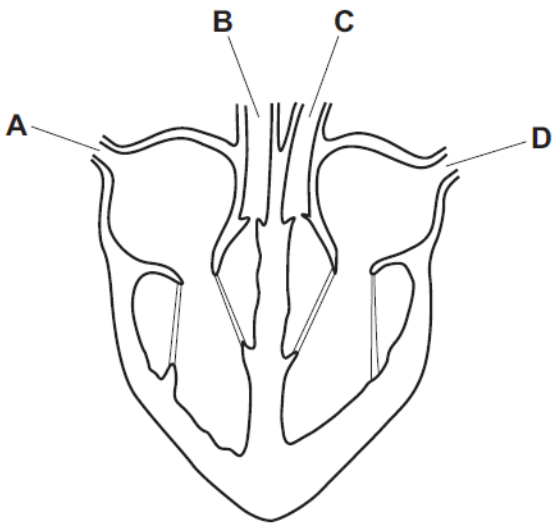
Which component is labelled with the correct function?



5. Nov/2021/Paper_13/No.19

The diagram shows a section through a mammalian heart.

Which part carries blood directly from the lungs?

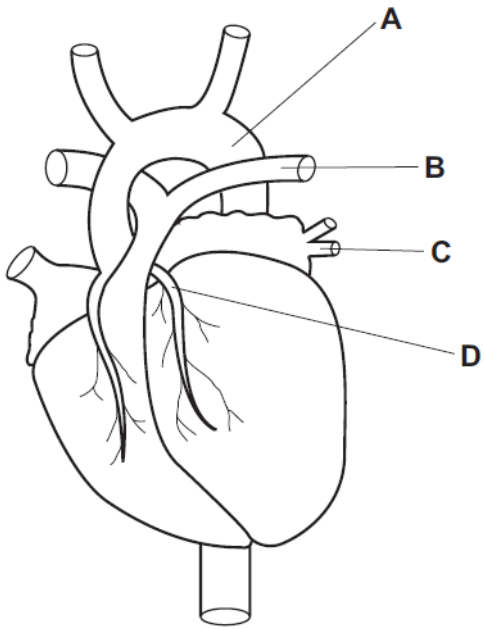


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6. Nov/2021/Paper_13/No.20

The diagram shows the external structure of the human heart.

Which label identifies a coronary artery?



7. Nov/2021/Paper_22/No.18

Which component of blood produces antibodies?

A lymphocytes

B phagocytes

C plasma

D red blood cells

8. Nov/2021/Paper_22/No.19

What do shunt vessels connect?

A arterioles to capillaries

B arterioles to venules

C capillaries to lymphatic vessels

D capillaries to venules

9. Nov/2021/Paper_23/No.18

Which component of blood produces antibodies?

A lymphocytes

B phagocytes

C plasma

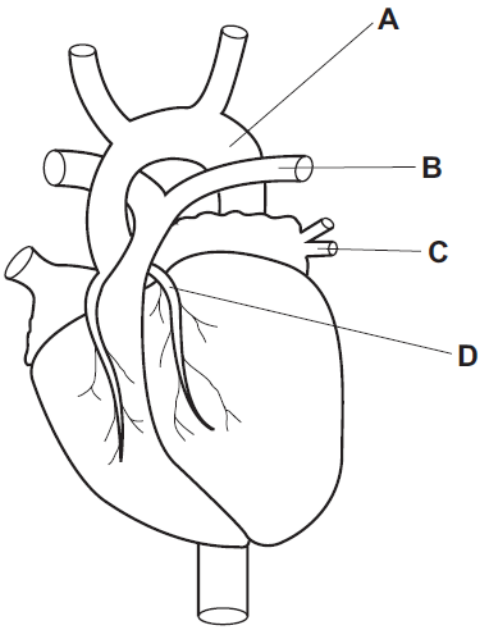
D red blood cells

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10. Nov/2021/Paper_23/No.19

The diagram shows the external structure of the human heart.

Which label identifies a coronary artery?



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11. Nov/2021/Paper_31/No.5

(a) Complete the sentences using the words or phrases from the list.

Each word or phrase may be used once, more than once or not at all.

different from	**divide**	**embryo**	**gamete**	**fuse**
fetus	**identical to**	**meiosis**	**mitosis**	**zygote**

In sexual reproduction, each parent organism produces a sex cell called a

..... . These cells are produced by a type of cell division called

..... .

The nuclei of two sex cells ..... to form a

..... in a process called fertilisation.

The offspring are genetically ..... each other and their parents.

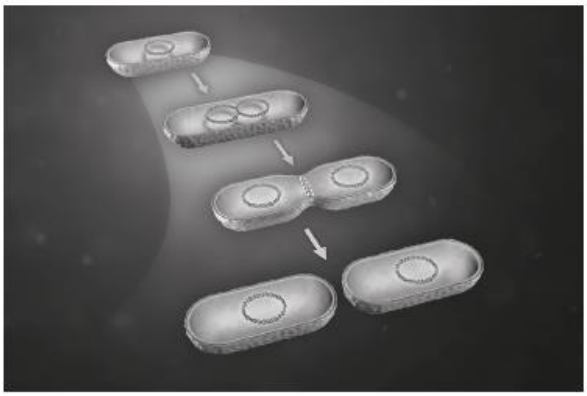
[5]

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(b) Fig. 5.1 shows four examples of reproduction in living organisms.



Q a sperm cell reaching an egg cell



R a single bacterial cell dividing



S a strawberry plant with offspring connected by a runner



T an insect pollinating a flower

Fig. 5.1

State the **two** letters in Fig. 5.1 that identify examples of asexual reproduction.

..... and .....

[2]

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(c) Fig. 5.2 is a diagram showing all of the chromosome pairs in a cell from a human male. The twenty-third pair of chromosomes are the sex chromosomes.

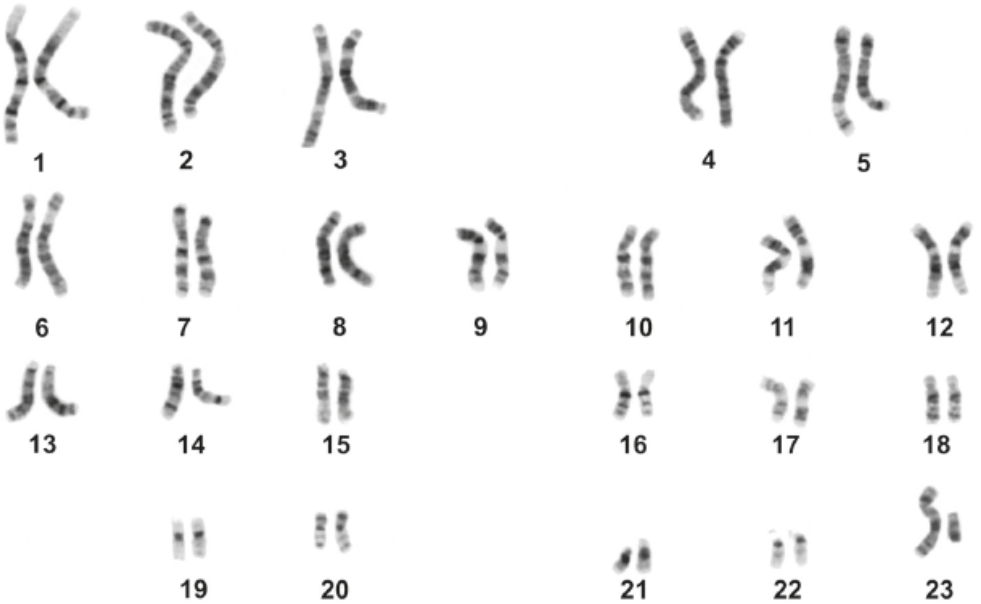


Fig. 5.2

Describe how the chromosomes in a human female differ from those shown in Fig. 5.2.

.....

.....

..... [1]

(d) Describe how insect-pollinated flowers are adapted for pollination.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 12]

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12. Nov/2021/Paper_41/No.5

The circulatory system is comprised of the heart, blood vessels and the blood.

(a) Explain how the structures of the heart ensure that blood flows in one direction.

Include the names of these structures in your answer.

.....

.....

.....

.....

.....

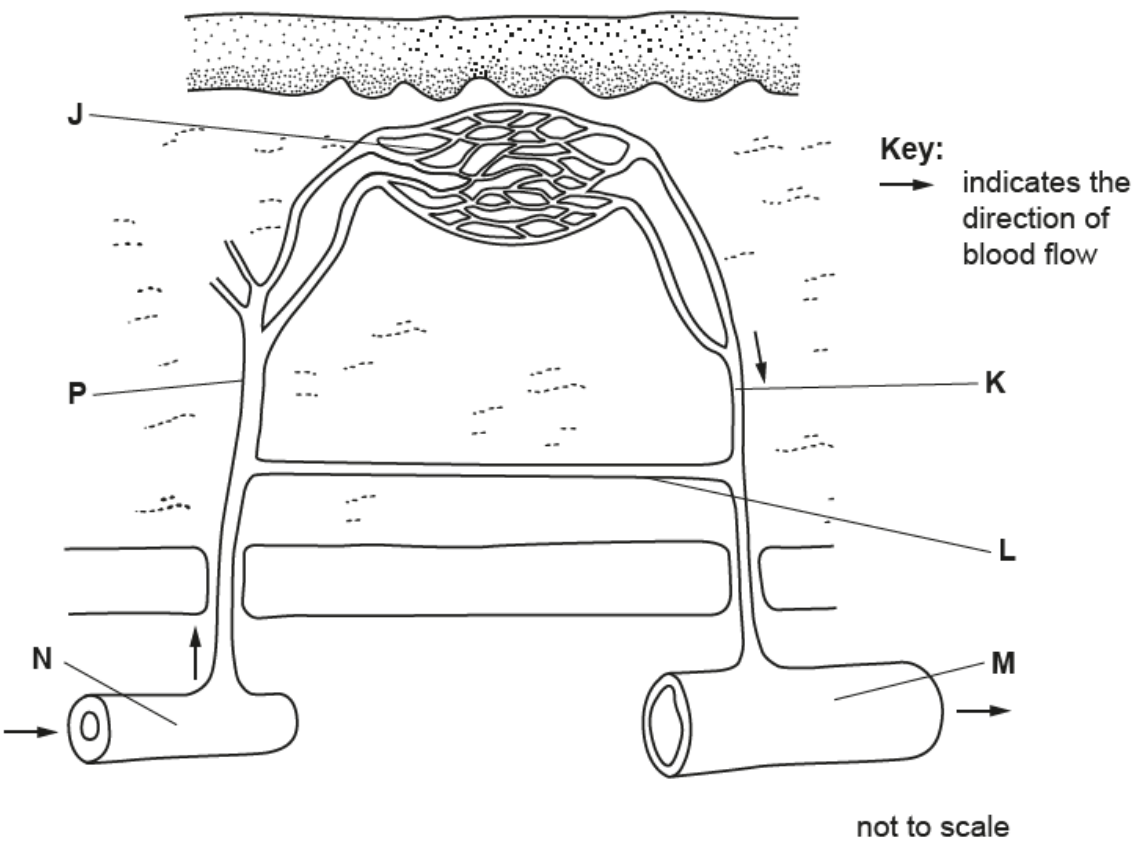
.....

.....

.....

..... [4]

(b) Fig. 5.1 shows a diagram of some blood vessels associated with the skin.



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Fig. 5.1

Table 5.1 shows the functions of some blood vessels.

Complete Table 5.1 by:

- naming the type of blood vessel
- stating the letter of the type of blood vessel from Fig. 5.1.

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Table 5.1

function	type of blood vessel	letter on Fig. 5.1
regulates blood flow by constricting and dilating		
collects blood from a network of the narrowest blood vessels		
withstands the highest blood pressure		
allows the transfer of substances to and from tissue fluid		
transports blood towards the heart		
redirects blood flow deeper under the surface of the skin		

[6]

(c) State the name of the blood vessels that deliver blood to the:

kidneys .....

heart muscle .....

[2]

(d) Describe how blockages in the vessels that deliver blood to the heart muscle can be treated.

.....

.....

.....

.....

.....

.....

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.....

.....

.....

..... [4]

[Total: 16]

Transport in animals – 2021 IGCSE 0610

1. March/2021/Paper_12/No.19

Which structures ensure the one-way flow of blood in the human circulatory system?

A alveoli

B capillaries

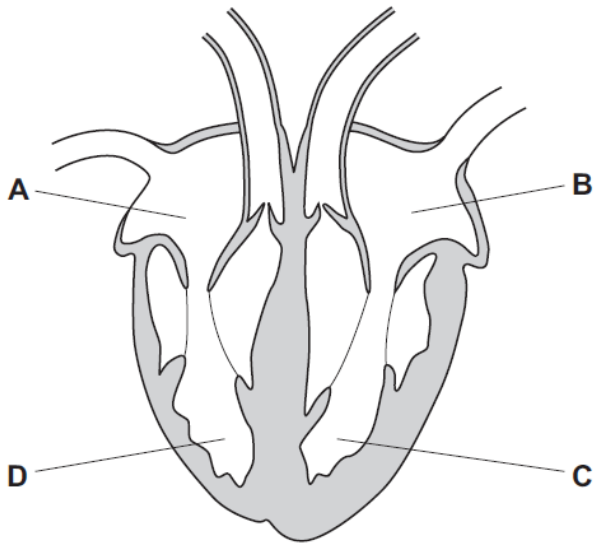
C synapses

D valves

2. March/2021/Paper_12/No.20

The diagram shows a section through the heart.

Which part pumps blood to the aorta?



3. March/2021/Paper_32/No.7

(a) Fig. 7.1 is a diagram of the circulatory system.

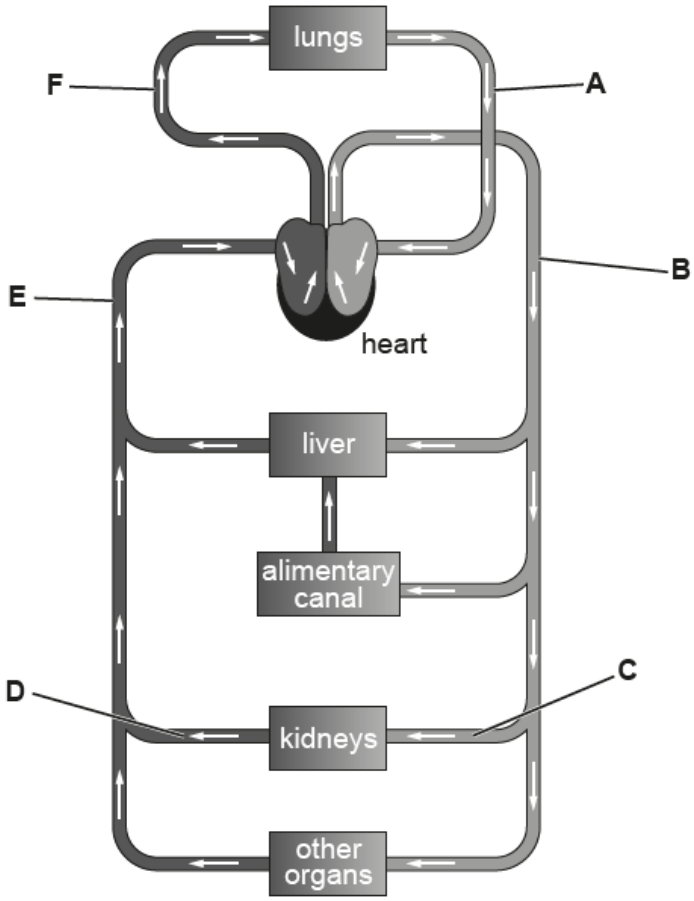


Fig. 7.1

(i) State the names of the blood vessels labelled **A**, **C** and **E** in Fig. 7.1.

A .....

C .....

E .....

[3]

(ii) State the letter in Fig. 7.1 that identifies the blood vessel that contains the highest oxygen concentration.

..... [1]

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(b) Describe **three** ways the structure of arteries differs from the structure of veins.

1 .....

.....

2 .....

.....

3.....

.....

[3]

(c) White blood cells are one of the components of blood.

(i) State **two** functions of white blood cells.

1 .....

2 .....

[2]

(ii) State **two other** main components of blood.

1 .....

2 .....

[2]

[Total: 11]

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4. March/2021/Paper_42/No.3

(a) The activity of the heart can be monitored using different methods.

Fig. 3.1 shows two ECG traces. One trace was recorded when the person was at rest and the second trace was recorded during exercise.

The length of time taken for one heart beat is indicated in Fig. 3.1 on the ECG trace recorded at rest.

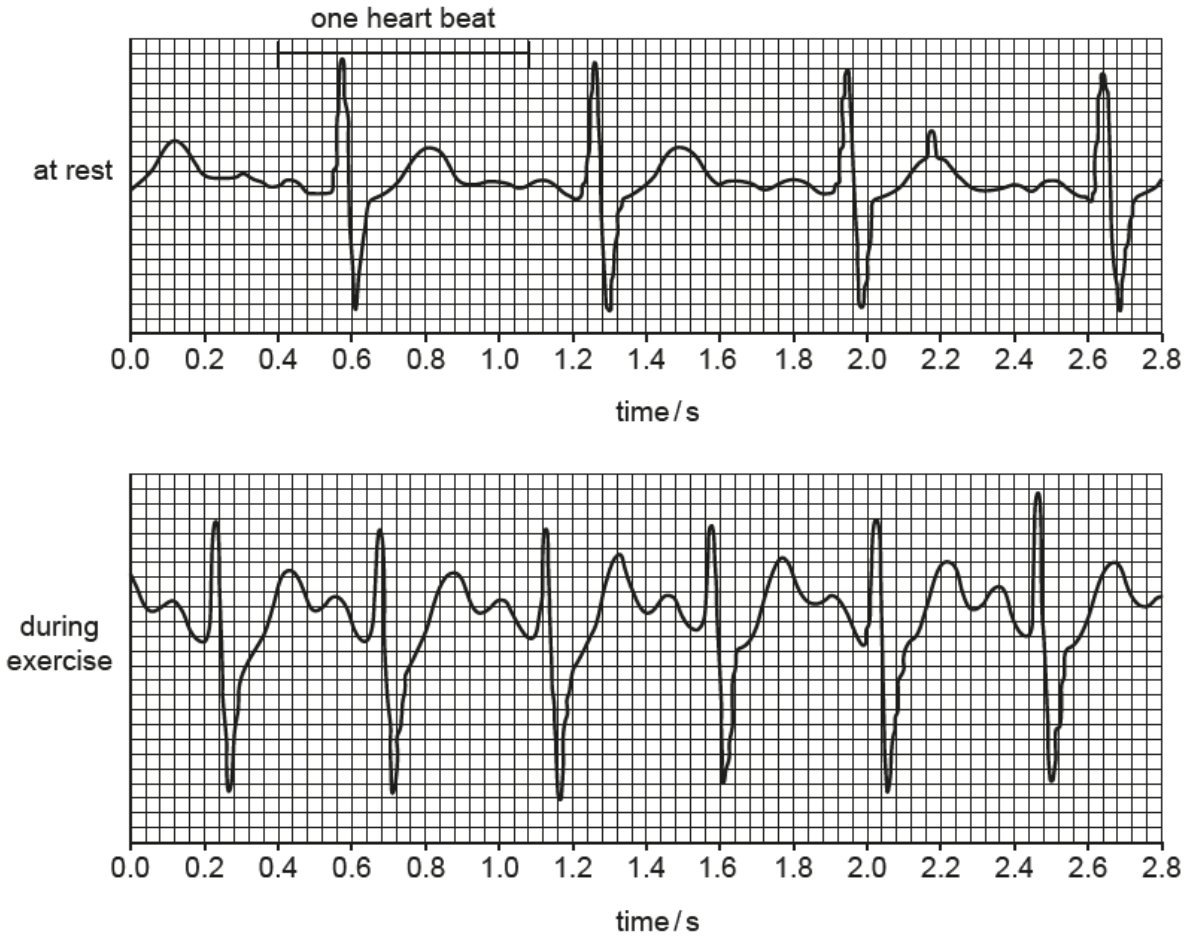


Fig. 3.1

(i) Estimate the resting heart rate of the person from their ECG trace in Fig. 3.1.

Space for working.

..... beats per minute
[2]

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(ii) Explain why the ECG trace recorded during exercise differs from the ECG trace recorded at rest.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Suggest **one other** way of monitoring the activity of the heart.

.....

..... [1]

(b) If exercise is very intense an oxygen debt is formed.

(i) Complete the sentence.

An oxygen debt results in a build-up of ..... in the

..... during vigorous exercise.

[2]

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(ii) Outline how the body removes an oxygen debt.

.....

.....

.....

.....

.....

.....

.....

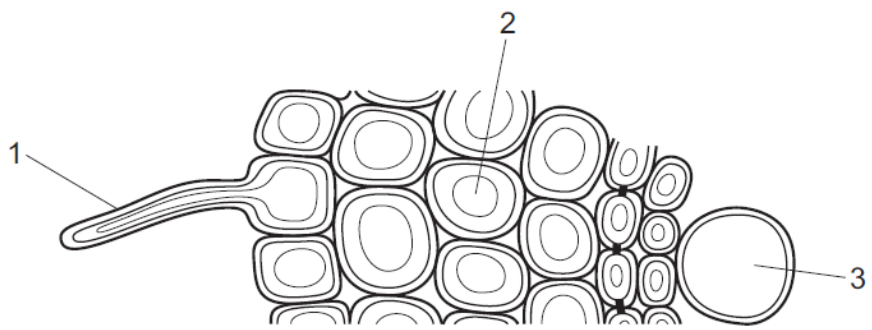
.....

..... [4]

[Total: 13]

5. June/2021/Paper_11/No.17

The diagram shows part of a cross-section of a root.



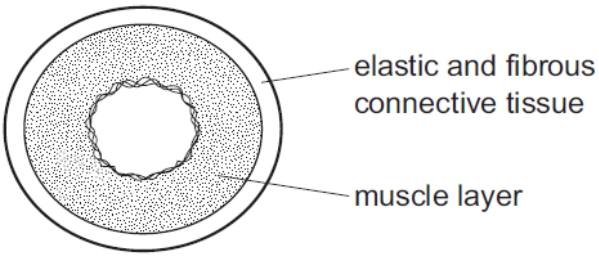
What are cells 1, 2 and 3?

	1	2	3
A	root cortex cell	root hair cell	mesophyll cell
B	root hair cell	root cortex cell	xylem
C	root hair cell	root cortex cell	mesophyll cell
D	root cortex cell	root hair cell	xylem

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6. June/2021/Paper_11/No.20

The diagram shows a cross-section through a human blood vessel.



Which type of blood vessel does the diagram show?

A an artery

B a capillary

C a vein

D a ventricle

7. June/2021/Paper_11/No.21

What is a function of some white blood cells?

A to carry glucose

B to carry oxygen

C to produce antibiotics

D to produce antibodies

8. June/2021/Paper_12/No.19

How does blood enter the heart?

A through arteries into the atria

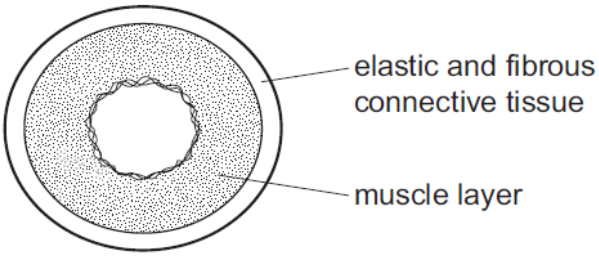
B through arteries into the ventricles

C through veins into the atria

D through veins into the ventricles

9. June/2021/Paper_12/No.20

The diagram shows a cross-section through a human blood vessel.



Which type of blood vessel does the diagram show?

A an artery

B a capillary

C a vein

D a ventricle

10. June/2021/Paper_13/No.21

What is a function of some white blood cells?

A to carry glucose

B to carry oxygen

C to produce antibiotics

D to produce antibodies

11. June/2021/Paper_13/No.19

Through which blood vessels does blood flow into the heart?

1 pulmonary artery

2 pulmonary vein

3 vena cava

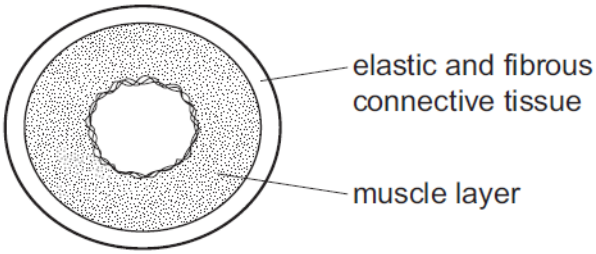
4 aorta

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

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12. June/2021/Paper_13/No.20

The diagram shows a cross-section through a human blood vessel.



Which type of blood vessel does the diagram show?

A an artery

B a capillary

C a vein

D a ventricle

13. June/2021/Paper_13/No.21

What is a function of some white blood cells?

A to carry glucose

B to carry oxygen

C to produce antibiotics

D to produce antibodies

14. June/2021/Paper_22/No.9

Which element is found in proteins but **not** carbohydrates?

A carbon

B hydrogen

C nitrogen

D oxygen

15. June/2021/Paper_22/No.20

What is the sequence of organs that blood passes through during one circulation of the body of a fish?

A muscle → heart → gill → muscle

B muscle → gill → heart → muscle

C muscle → heart → gill → heart → muscle

D muscle → gill → heart → gill → muscle

16. June/2021/Paper_22/No.27

A person's skin looks more red in a warm environment than it does in a cool environment.

Which explanation is correct?

A The arterioles supplying capillaries in the skin vasodilate and less blood flows to the skin surface.

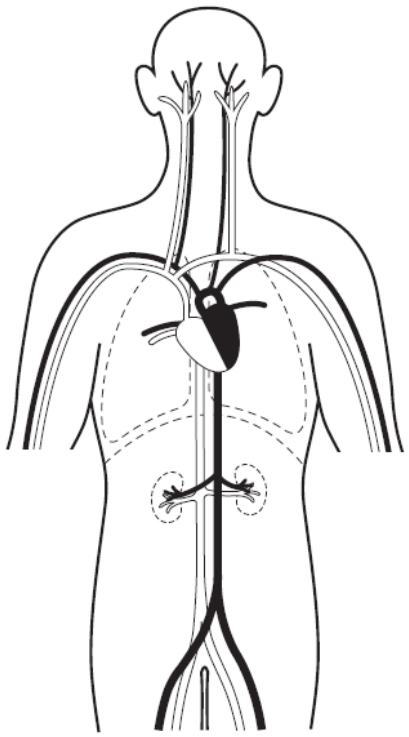
B The arterioles supplying capillaries in the skin vasodilate and more blood flows to the skin surface.

C The arterioles supplying capillaries in the skin vasoconstrict and more blood flows to the skin surface.

D The arterioles supplying capillaries in the skin vasoconstrict and less blood flows to the skin surface.

17. June/2021/Paper_23/No.5

The diagram shows some of the blood vessels and other structures in the human body.



The blood vessels shown are all parts of the same

A cell.

B organ.

C organ system.

D tissue.

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18. June/2021/Paper_23/No.19

Through which blood vessels does blood flow into the heart?

1 pulmonary artery

2 pulmonary vein

3 vena cava

4 aorta

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

19. June/2021/Paper_23/No.20

What is an angioplasty?

A a recording of the heart's electrical activity to check for abnormalities

B an operation to insert a new vessel that diverts blood around a narrowed section

C the insertion of a tube into a blood vessel to allow blood to flow more freely

D the widening of a blood vessel by means of a balloon-like device

20. June/2021/Paper_31/No.5

(a) Fig. 5.1 is a diagram of a human heart.

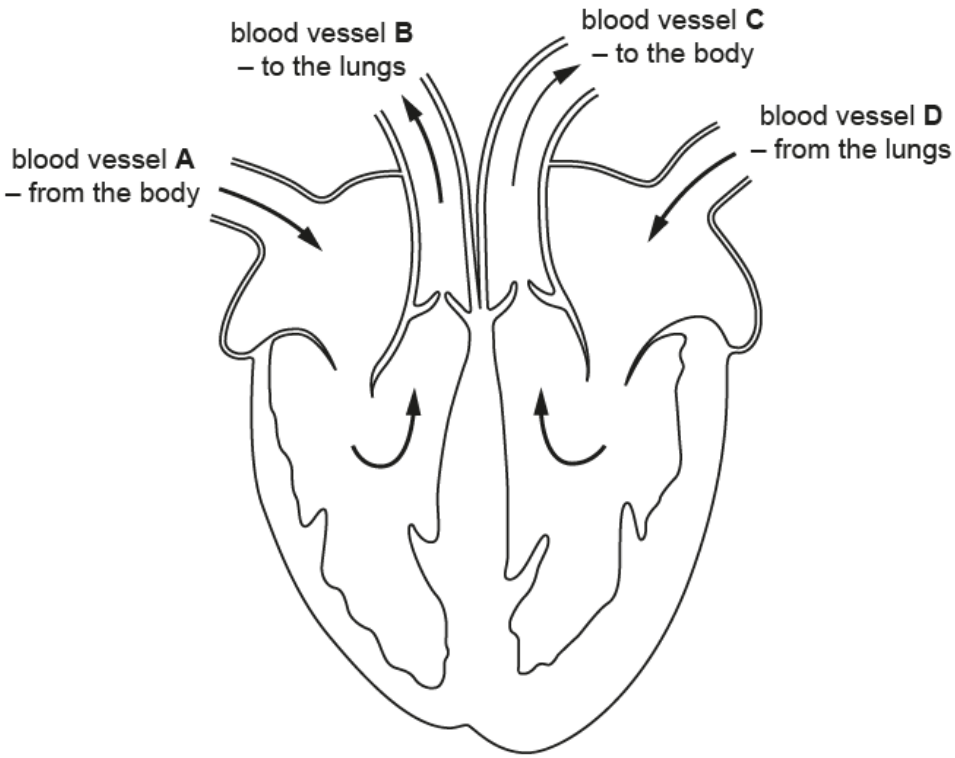


Fig. 5.1

(i) Use label lines and labels to identify these structures on Fig. 5.1:

- **atrium**
- **septum**
- **ventricle**
- **valve**

[4]

(ii) Identify the letter or letters of all the blood vessels from Fig. 5.1, that:

are arteries .....

is the pulmonary vein ..... .

[2]

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(b) The activity of the heart can be monitored by measuring the pulse rate.

State **two other** ways of monitoring the activity of the heart.

1 .....

2 .....

[2]

(c) Coronary heart disease (CHD) is caused by a blockage of blood vessels in the heart.

(i) State the name of the blood vessels that become blocked.

..... [1]

(ii) State **three** risk factors for developing CHD.

1 .....

2 .....

3 .....

[3]

[Total: 12]

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21. June/2021/Paper_32/No.6

(ii) Calculate the percentage change in the pulse rate between 0 and 15 minutes for student **A**.

Give your answer to the nearest whole number.

Space for working.

..... %
[3]

(iii) State **two** other methods that can be used to monitor the activity of the heart.

1 .....

2 .....
[2]

(b) Exercise levels, environmental temperature and changes in water intake can affect the volume and concentration of urine produced.

Complete the sentences by circling the correct words **in bold**.

The first sentence has been done for you.

More exercise causes the volume of urine to **increase** / (**decrease**) / **stay the same** and the concentration of urine to (**increase**) / **decrease** / **stay the same**.

A greater intake of water causes the volume of urine to **increase** / **decrease** / **stay the same** and the concentration of urine to **increase** / **decrease** / **stay the same**.

A higher environmental temperature causes the volume of urine to **increase** / **decrease** / **stay the same** and the concentration of urine to **increase** / **decrease** / **stay the same**.
[2]

[Total: 11]

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Transport in animals – 2020 IGCSE 0610

1. Nov/2020/Paper_11/No.19

The table shows some features of blood vessels.

Which row shows the features of a vein?

	direction of blood flow	size of the central hole (lumen)	thickness of wall
A	away from the heart	large	thick
B	away from the heart	small	thick
C	towards heart	small	thin
D	towards heart	large	thin

2. Nov/2020/Paper_11/No.24

The amount of urea in the blood increases as it passes through organ X.

What is organ X?

A heart

B kidney

C liver

D pancreas

3. Nov/2020/Paper_12/No.20

Some functions of blood are listed.

1 antibody production

2 blood clotting

3 oxygen transport

4 phagocytosis

What are functions of white blood cells?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

4. Nov/2020/Paper_13/No.19

In a mammal, what ensures the blood flows one-way round the circulatory system?

A brain

B capillaries

C lungs

D valves

5. Nov/2020/Paper_13/No.20

Which structure separates the right and left sides of the heart?

A coronary artery

B one-way valve

C right atrium

D septum

6. Nov/2020/Paper_21/No.17

The table shows some features of blood vessels.

Which row shows the features of a vein?

	direction of blood flow	size of the central hole (lumen)	thickness of wall
A	away from the heart	large	thick
B	away from the heart	small	thick
C	towards heart	small	thin
D	towards heart	large	thin

7. Nov/2020/Paper_21/No.18

Where are valves found that prevent blood from flowing in the wrong direction?

A capillaries and arteries

B lungs and veins

C heart and capillaries

D heart and veins

8. Nov/2020/Paper_22/No.17

What ensures that blood flows in one direction in the human circulatory system?

A diffusion of carbon dioxide

B diffusion of oxygen

C thick walled arteries

D valves

9. Nov/2020/Paper_22/No.18

The diagrams show four components of blood.

Which component produces antibodies?

A 

B 

C 

D 

10. Nov/2020/Paper_23/No.17

In a mammal, what ensures the blood flows one-way round the circulatory system?

A brain

B capillaries

C lungs

D valves

11. Nov/2020/Paper_23/No.18

Which row correctly identifies the blood vessels?

	largest internal space (lumen)	thickest muscular wall	transports blood towards the heart
A	pulmonary artery	capillary	pulmonary vein
B	pulmonary artery	pulmonary vein	capillary
C	pulmonary vein	capillary	pulmonary artery
D	pulmonary vein	pulmonary artery	pulmonary vein

12. Nov/2020/Paper_33/No.5

(a) (i) Table 5.1 shows some statements about arteries, capillaries and veins.

Place ticks (✓) in the boxes to show which statements are correct for arteries, capillaries and veins.

One has been done for you.

Table 5.1

statements	arteries	capillaries	veins
carry blood away from the heart	✓		
supply cells with nutrients and remove waste products			
return blood to the heart			
have a thick wall containing muscle and elastic tissue			
have a thin wall containing muscle and elastic tissue			
have a very thin wall with no muscle or elastic tissue			

[5]

(ii) State **one** other way in which the structure of a vein is different from an artery.

..... [1]

(b) Oxygen moves from the blood into body cells.

Carbon dioxide moves from body cells into the blood.

(i) State the name of the process in a cell that uses oxygen and releases carbon dioxide.

..... [1]

Fig. 5.1 is a drawing representing the movement of molecules into and out of an animal cell.

The number of dots represent the concentrations of molecules inside and outside the cell.

The arrows show the direction of movement of the molecules.

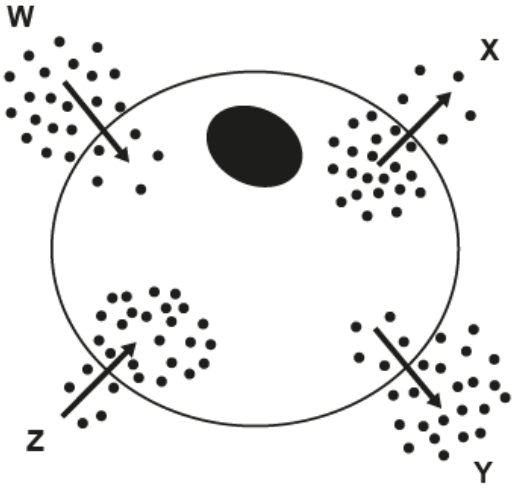


Fig. 5.1

(ii) State the letter(s) that represent the movement of:

molecules by active transport .....

molecules by diffusion .....

[2]

[Total: 9]

Transport in animals – 2020 IGCSE 0610

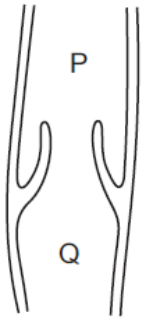
1. March/2020/Paper_12/No.19

Which person is most at risk from developing coronary heart disease?

	age	gender	activity level	other information
A	23	female	professional athlete	non-smoker
B	40	male	plays sport at weekends	non-smoker
C	19	female	plays sport twice a week	smokes 5 cigarettes a day
D	65	male	does no exercise	smokes 20 cigarettes a day

2. March/2020/Paper_12/No.20

The diagram shows a section through a blood vessel.



Which type of blood vessel is shown, and in which direction does the blood flow?

	type of vessel	direction of flow
A	artery	P to Q
B	artery	Q to P
C	vein	P to Q
D	vein	Q to P

3. March/2020/Paper_22/No.19

Mammals have a double circulation.

Which shows the correct sequence for the movement of blood in a mammal?

A body → heart → lungs → heart

B body → lungs → body → heart

C heart → lungs → body → heart

D heart → body → lungs → heart

4. March/2020/Paper_22/No.20

The diagram shows a section through a blood vessel.



Which type of blood vessel is shown, and in which direction does the blood flow?

	type of vessel	direction of flow
A	artery	P to Q
B	artery	Q to P
C	vein	P to Q
D	vein	Q to P

5. March/2020/Paper_42/No.2

(b) Describe the functions of arterioles in the skin.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Describe the functions of lymph nodes in the lymphatic system.

.....

.....

.....

.....

..... [2]

(d) Lacteals are part of the lymphatic system.

(i) State where in the body lacteals are found.

..... [1]

(ii) Describe the role of lacteals.

.....

.....

..... [1]

[Total: 12]

6. June/2020/Paper_11/No.15

Which blood vessel carries blood to the muscle of the heart?

A coronary artery

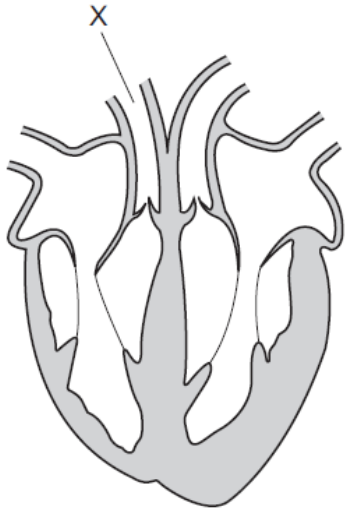
B pulmonary artery

C renal vein

D vena cava

7. June/2020/Paper_11/No.16

The diagram shows a section through the heart and its blood vessels.



Which row gives the vessel name and the direction of blood flow in vessel X?

	vessel name	direction of blood flow
A	aorta	towards the lungs
B	pulmonary artery	towards the lungs
C	pulmonary artery	away from the lungs
D	vena cava	away from the lungs

8. June/2020/Paper_12/No.15

Which blood vessel carries blood to the muscle of the heart?

A coronary artery

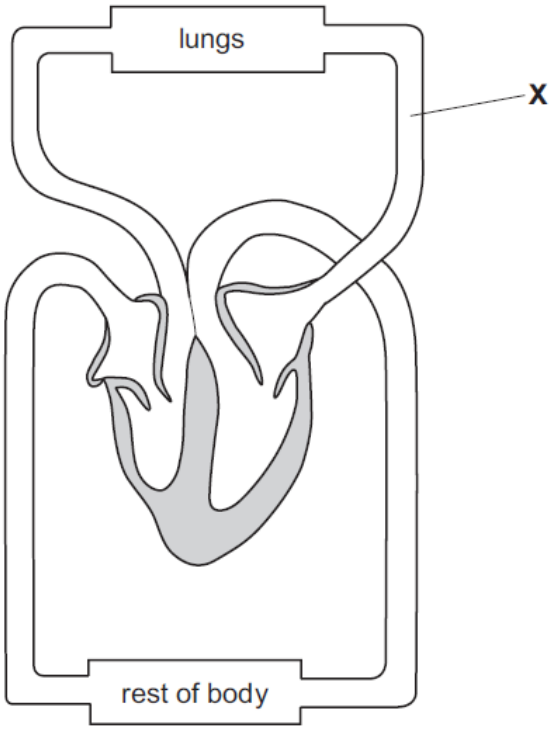
B pulmonary artery

C renal vein

D vena cava

9. June/2020/Paper_12/No.16

The diagram shows the human heart and main blood vessels.



What is the blood vessel labelled **X**?

A aorta

B pulmonary artery

C pulmonary vein

D vena cava

10. June/2020/Paper_13/No.15

Which blood vessel carries blood to the muscle of the heart?

A coronary artery

B pulmonary artery

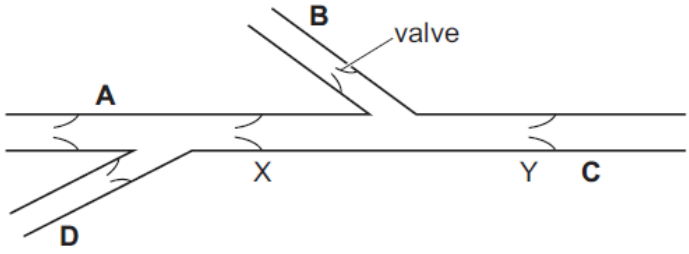
C renal vein

D vena cava

11. June/2020/Paper_13/No.16

The diagram shows some veins in the human arm and the valves that they contain.

If blood is squeezed out of section X–Y, where should pressure be placed on a vein to stop blood flowing into this section again?



12. June/2020/Paper_21/No.17

Which pathway is taken by blood in a fish?

A gills → heart → body → gills

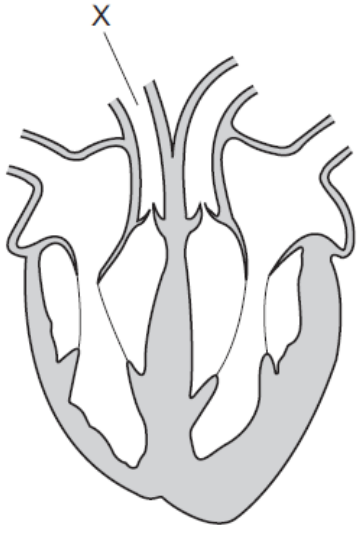
B body → gills → heart → body

C heart → gills → body → heart

D heart → body → gills → body

13. June/2020/Paper_21/No.18

The diagram shows a section through the heart and its blood vessels.



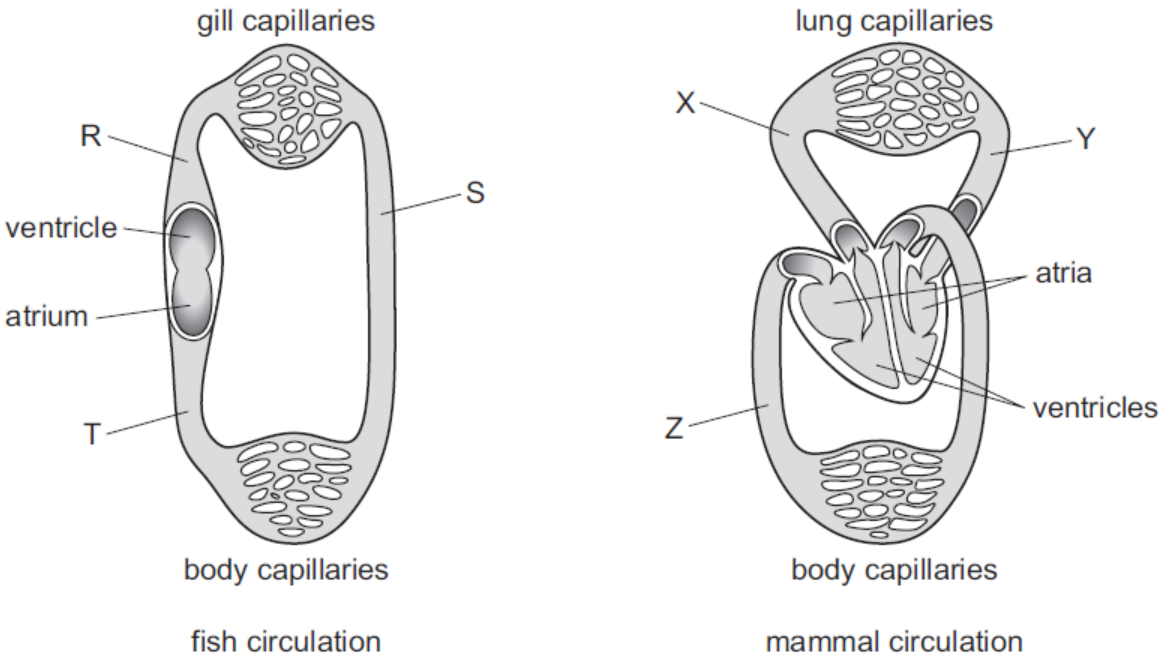
Which row gives the vessel name and the direction of blood flow in vessel X?

	vessel name	direction of blood flow
A	aorta	towards the lungs
B	pulmonary artery	towards the lungs
C	pulmonary artery	away from the lungs
D	vena cava	away from the lungs

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14. June/2020/Paper_22/No.17

The diagrams show the single circulation of a fish and the double circulation of a mammal.

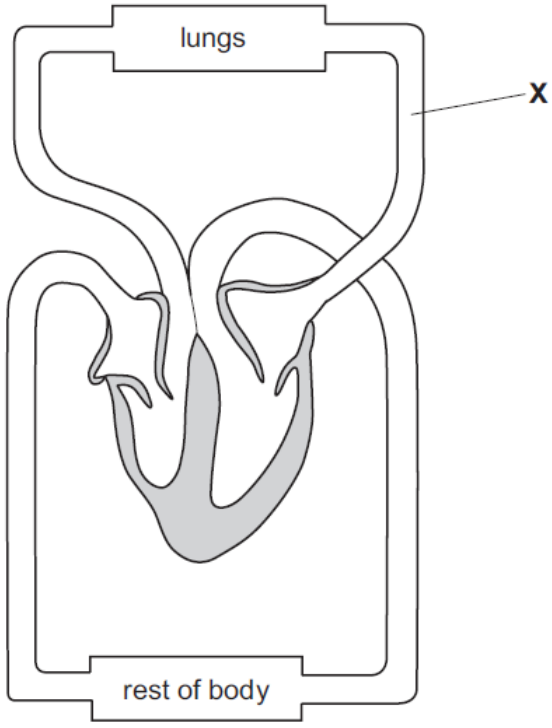


Which letters represent areas of oxygenated blood?

A R and X **B** S and Y **C** T and Y **D** T and Z

15. June/2020/Paper_22/No.18

The diagram shows the human heart and main blood vessels.



What is the blood vessel labelled **X**?

A aorta

B pulmonary artery

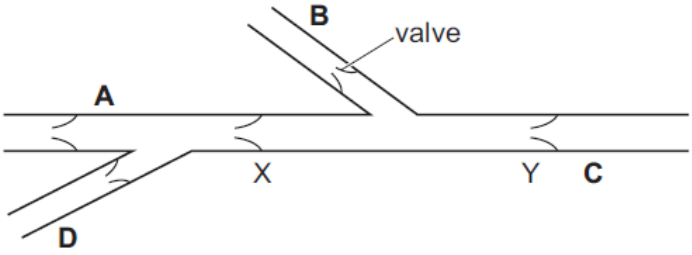
C pulmonary vein

D vena cava

16. June/2020/Paper_23/No.17

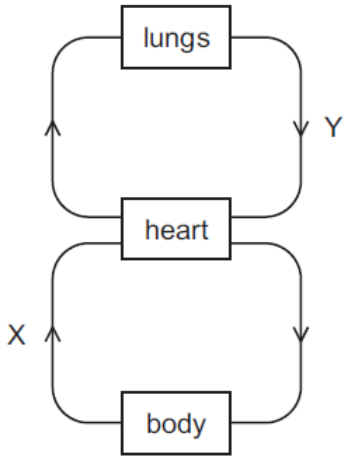
The diagram shows some veins in the human arm and the valves that they contain.

If blood is squeezed out of section X–Y, where should pressure be placed on a vein to stop blood flowing into this section again?



17. June/2020/Paper_23/No.18

The diagram shows some of the blood vessels leaving and returning to the heart.



Which row is correct for blood vessels X and Y?

	name of blood vessel X	description of oxygen content of the blood in X	name of blood vessel Y	description of oxygen content of the blood in Y
A	aorta	deoxygenated	pulmonary artery	oxygenated
B	aorta	oxygenated	pulmonary vein	deoxygenated
C	vena cava	deoxygenated	pulmonary vein	oxygenated
D	vena cava	oxygenated	pulmonary artery	deoxygenated

7. Transport in humans

Content

7.1 Circulatory system

Learning outcomes

Candidates should be able to:

(a) **describe the circulatory system as a system of tubes with a pump and valves to ensure one-way flow of blood**

(b) **describe the double circulation in terms of a low pressure circulation to the lungs and a high pressure circulation to the body tissues and relate these differences to the different functions of the two circuits**

(c) **name the main blood vessels that carry blood to and from the heart, lungs, liver and kidneys**

(d) **describe the structure and function of the heart in terms of muscular contraction and the working of valves**

(e) **compare the structure and function of arteries, veins and capillaries**

(f) **investigate and state the effect of physical activity on pulse rate**

(g) **describe coronary heart disease in terms of the occlusion of coronary arteries and state the possible causes (diet, stress and smoking) and preventive measures**

(h) **identify red and white blood cells as seen under the light microscope on prepared slides, and in diagrams and photomicrographs**

(i) **list the components of blood as red blood cells, white blood cells, platelets and plasma**

(j) **state the functions of blood:**

- **red blood cells – haemoglobin and oxygen transport**
- **white blood cells – phagocytosis, antibody formation and tissue rejection**
- **platelets – fibrinogen to fibrin, causing clotting**
- **plasma – transport of blood cells, ions, soluble food substances, hormones, carbon dioxide, urea, vitamins and plasma proteins**

(k) **describe the transfer of materials between capillaries and tissue fluid.**

Transport in Human P2 questions

O/N18/22/Q1

Fig. 1 and Fig. 2 show transverse sections of two types of blood vessel.

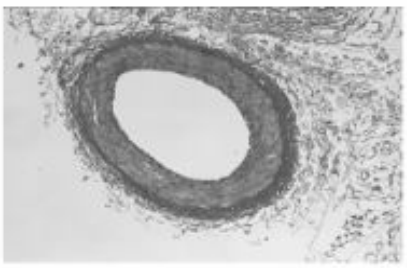


Fig. 1

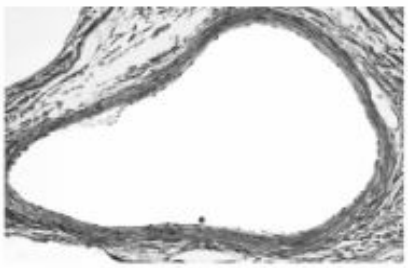


Fig. 2

(a) **(i)** Name the type of blood vessel shown in:

Fig. 1 .....

Fig. 2 ..... [2]

(ii) Describe the differences in the structures shown in Fig. 1 and Fig. 2 that helped you to identify these blood vessels.

.....

.....

.....[2]

(b) The diagram below is of a simplified, incomplete longitudinal section from the type of blood vessel shown in Fig. 2. The direction of blood flow is shown.



(i) Complete the diagram by drawing **one** set of valves. [2]

(ii) Describe the function of these valves.

.....

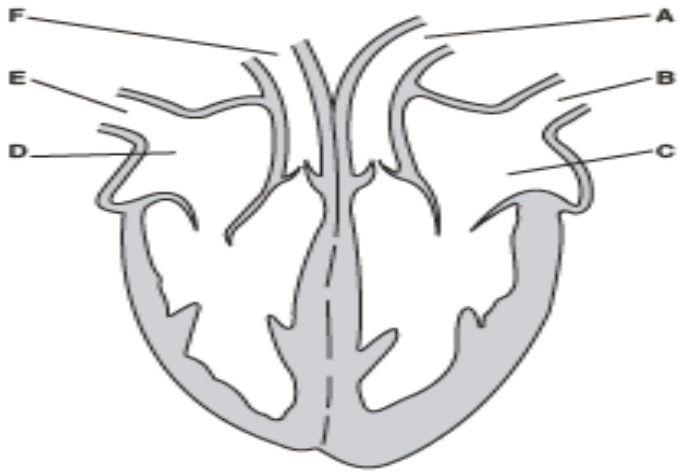
.....

.....[2]

[Total: 8]

M/J18/21/Q4

The diagram shows a human heart and associated blood vessels.



(a) Complete the table to show which of the parts **A** to **F** contain oxygenated blood and which contain deoxygenated blood.

Write **each** of the letters **A** to **F** in either the right or the left side of the table.

contain oxygenated blood	contain deoxygenated blood

[2]

(b) (i) Complete the table below to show which of **A** to **F** are involved in the circulation of blood to or from each of the following locations:

- the lungs,
- the body tissues.

Write **each** of the letters **A** to **F** in either the right or the left side of the table.

blood to or from the lungs	blood to or from the body tissues

[4]

(ii) Compare the pressure of blood in the circulation to the body tissues and the pressure of blood in the circulation to the lungs.

.....

.....[1]

(iii) Explain how the structure of the heart produces this difference in blood pressure.

.....

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.....

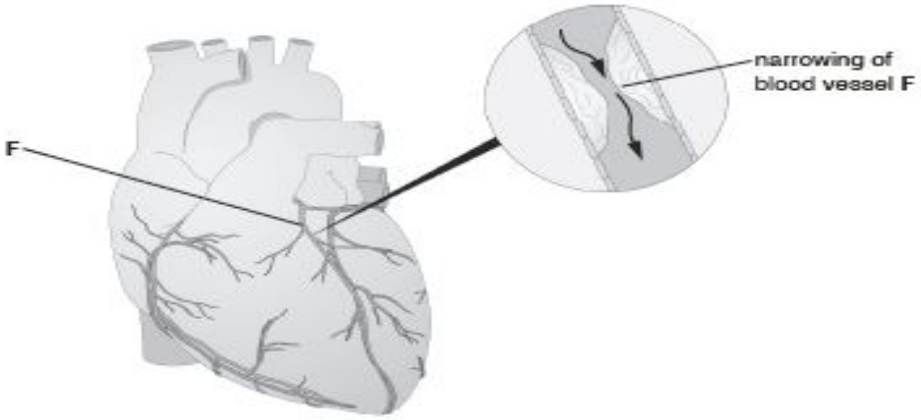
.....[3]

[Total: 10]

M/J18/22/Q2

The diagram shows the human heart.

The blood vessel labelled F may become narrowed as shown.



(a) (i) Name blood vessel F.

.....

[1]

(ii) Name the disease caused by the narrowing of this blood vessel.

.....

[1]

(iii) State three factors that may lead to the narrowing of this blood vessel.

1 .....

2 .....

3 .....

[3]

(iv) Suggest and explain how a person might be affected by the disease caused by the narrowing of blood vessel F.

.....

.....

.....

.....

.....

.....[5]

(ii) Compare the pressure of blood in the circulation to the body tissues and the pressure of blood in the circulation to the lungs.

.....

.....[1]

(iii) Explain how the structure of the heart produces this difference in blood pressure.

.....

.....

.....

.....[3]

[Total: 10]

O/N17/21/Q4

Fig. 4.1 shows a human cell.

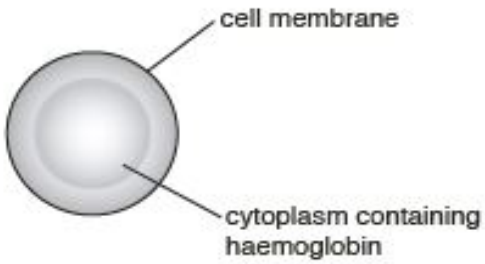


Fig. 4.1

(a) Name and state the main function of the type of cell shown in Fig. 4.1.

name .....

function .....

.....

[2]

(b) Suggest and explain what symptoms might be experienced by a person with an unusually low number of this type of cell.

.....

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.....

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.....[4]

(c) Explain what would happen to the cell shown in Fig. 4.1 if placed in pure water.

.....

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.....[3]

[Total: 9]

Transport in Human P2 questions

M/J17/21/Q3(a and b)

Fig. 3.1 shows an organ, **X**, and its associated blood vessels P, Q and R.

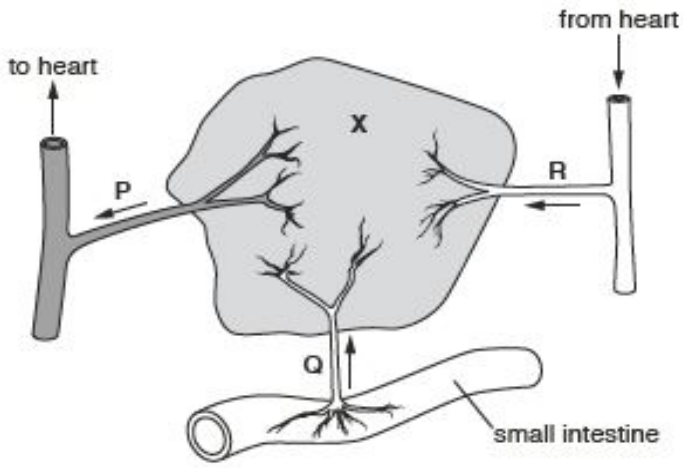


Fig. 3.1

Organ **X** is involved in the following processes:

- the metabolism of amino acids,
- the breakdown of chemical substances, including alcohol.

(a) Name organ **X** and each of its associated blood vessels.

organ **X** .....

blood vessel P .....

blood vessel Q .....

blood vessel R ..... [4]

(b) Compare the structure of the blood vessels P and R in Fig. 3.1.

.....

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.....[3]

O/N16/21/Q8

(a) Describe the double circulation of blood in the human circulatory system and the different functions of the two circuits.

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..... [6]

(b) Describe the structure of a capillary and the transfer of a named material between capillaries and tissue fluid.

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..... [4]

Transport in Human P2 questions

O/N16/22/Q4

Fig. 4.1 shows a section through a heart connected to what is described as an LV Assist Device.

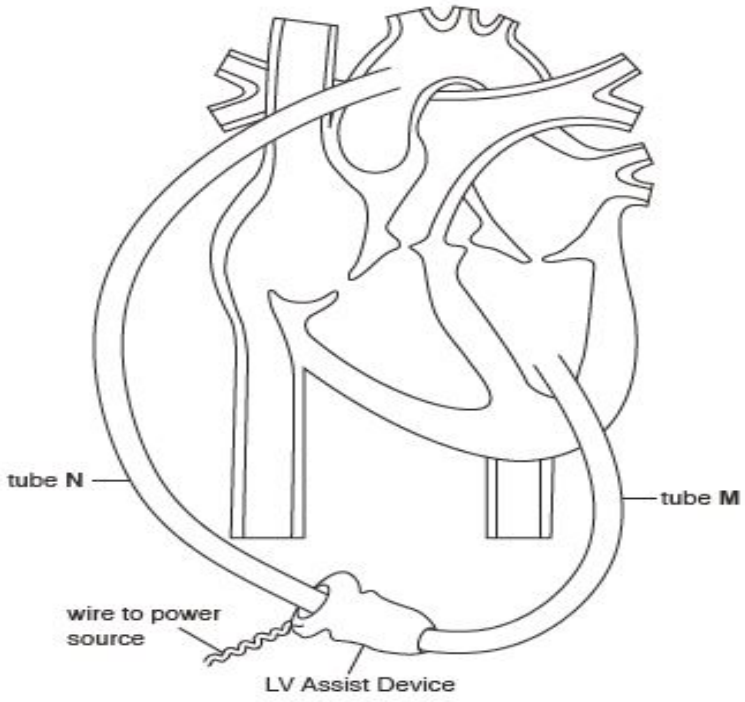


Fig. 4.1

(a) **(i)** Use Fig. 4.1 to suggest why the device is called an LV Assist Device.

.....

.....[1]

(ii) Name the type of tissue through which tube **M** passes.

..... [1]

(iii) Name the blood vessel into which tube **N** is inserted.

..... [1]

(b) Draw arrows on Fig. 4.1 to show

(i) the direction of blood flow in the blood vessels that carry blood into the heart. [2]

(ii) the direction of blood flow through the LV Assist Device. [1]

(c) Name the valve that is bypassed by blood flowing through the LV Assist Device.

.....[1]

(d) Sometimes the pulmonary circulation requires artificial assistance. Suggest and describe where, under these circumstances, an Assist Device would be fitted.

.....

.....

.....

.....[2]

[Total: 9]

Transport in Human P2 questions

O/N15/21/Q2

Fig. 2.1 shows a vertical section through a human heart viewed from the front.
Two chambers, **X** and **Y**, are labelled.

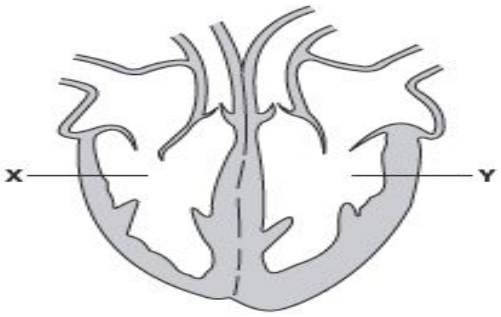


Fig. 2.1

(a) Use Fig. 2.1, and your knowledge of the circulatory system, to complete Table 2.1.

Table 2.1

chamber	name of chamber	name of blood vessel carrying blood from chamber
X		
Y		

[4]

(b) Fig. 2.2(a) shows how the mean blood pressure changes as blood flows through different types of blood vessel after leaving the heart.

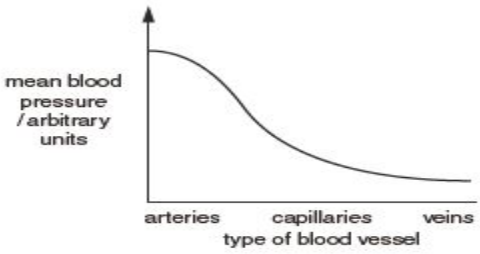


Fig. 2.2(a)

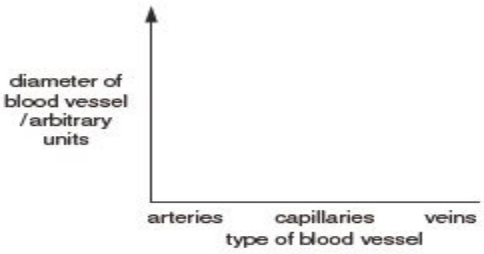


Fig. 2.2(b)

(i) Draw a line on Fig. 2.2(b) to show how the diameters of the vessels that blood flows through vary.

[2]

(ii) Use the line you have drawn on Fig. 2.2(b), and your biological knowledge, to explain why the mean blood pressure is higher in an artery than in a vein.

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..... [4]

(c) Fig. 2.3 shows blood returning to the heart at low pressure through a vein in a leg.

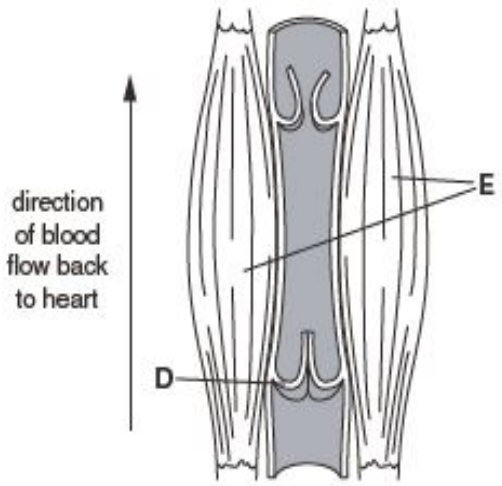


Fig. 2.3

Name part **D** in Fig. 2.3.

Explain how this part enables blood to return to the heart.

(i) name of part **D** .....

function .....

.....

..... [2]

(ii) Suggest how the parts labelled **E** in Fig. 2.3 help blood to return to the heart.

.....

.....

.....

.....

..... [2]

[Total: 14]

O/N15/21/Q8

Name the components of human blood and explain how each component carries out its function.

..... [10]

[Total: 10]

O/N15/22/Q3

Fig. 3.1 shows blood pressure changes as blood flows through part of the circulatory system, beginning at the right atrium, travelling to the lungs, and ending in the pulmonary vein.

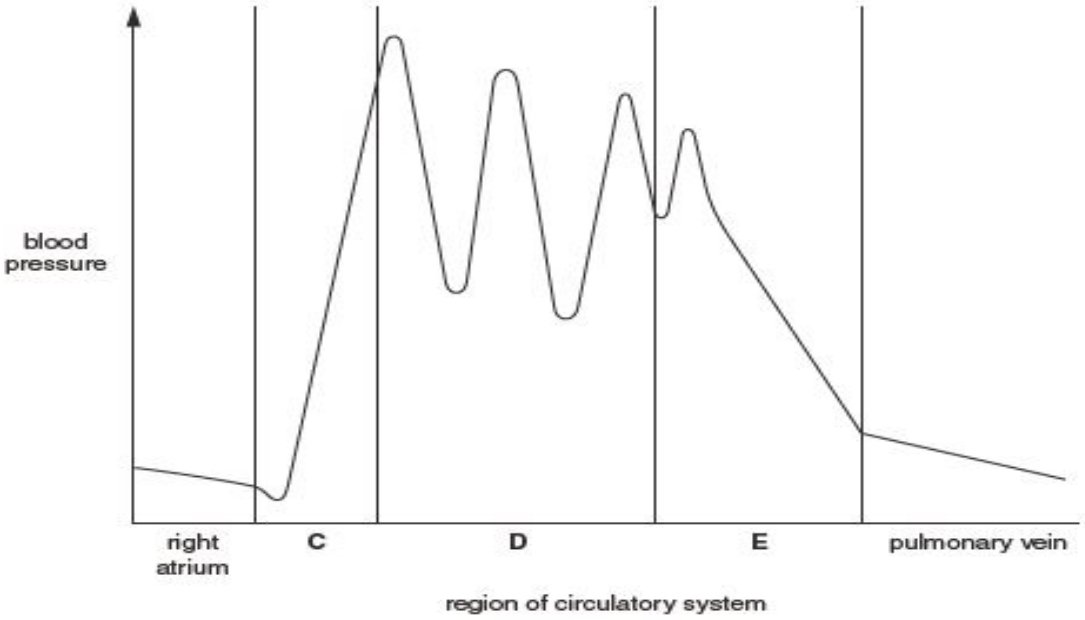


Fig. 3.1

(a) State which chamber of the heart is represented by **C**. Explain your answer.

chamber **C** .....

explanation .....

.....[2]

(b) Explain the reasons for the regular changes in blood pressure in region **D**.

.....

.....

.....

.....[2]

(c) Important chemical changes occur in the blood as it passes through region **E**.

(i) Identify region **E**.

.....[1]

(ii) Describe and explain the chemical changes that occur.

.....

.....

.....

.....

.....

.....

.....[3]

(d) Describe and explain how the shape of a graph drawn to show blood pressure changes as blood flows from the heart to the rest of the body and back again would differ from Fig. 3.1.

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 11]

O/N14/22/Q1

Fig. 1.1 shows a kidney and its associated structures. The arrows show the direction of flow of fluids in these structures.

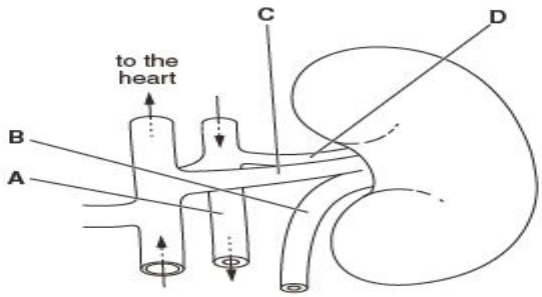


Fig. 1.1

(a) (i) Name the structure labelled **A** in Fig. 1.1. ..... [1]

(ii) Name the chamber of the heart through which blood in structure **A** last passed.

..... [1]

(b) Table 1.1 shows the relative concentrations of various substances in structures **B** and **C**. Complete the table to show the possible concentrations of these substances in structure **D**.

Table 1.1

substance	relative concentration in structure		
	B	C	D
amino acids	0.00	0.05	
glucose	0.00	0.10	
mineral ions	1.50	0.72	
proteins	0.00	8.00	
urea	2.00	0.03	

[5]

(c) Explain how the relative concentrations of glucose might change in structures **B**, **C** and **D** in a person with diabetes.

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

O/N14/22/Q9

(a) Explain what is meant by the term *double circulation*.

.....

.....

.....

.....

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.....

.....

..... [4]

(b) Explain how the heart is adapted to keep blood flowing in a double circulation.

.....

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.....

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..... [6]

[Total: 10]

Transport in Human P2 questions

M/J14/21/Q1

Fig. 1.1 shows a sample of human blood seen using a microscope.

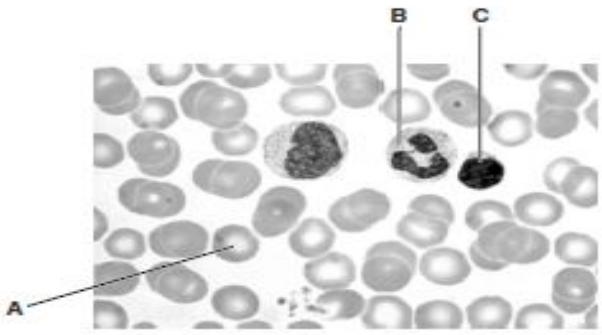


Fig. 1.1

(a) (I) Name the type of cell labelled **A** in Fig. 1.1. State the function of this type of cell.

type of cell .....

function

.....

[2]

(II) Use your knowledge of the structure of this type of cell to suggest why the cell labelled **A** in Fig. 1.1 appears to be more lightly coloured at its centre than at its edge.

.....

.....

.....

.....

.....[3]

(b) (I) Name the type of cells labelled **B** and **C** in Fig. 1.1.

B ..... **C** ..... [1]

(II) Some diseases can cause a person to have fewer of cells **B** and **C** in the blood. Use your knowledge of how cells **B** and **C** carry out their functions to suggest a problem this may cause for a person. Give an explanation for your answer.

problem

.....

explanation

.....

.....

.....

.....

.....

.....

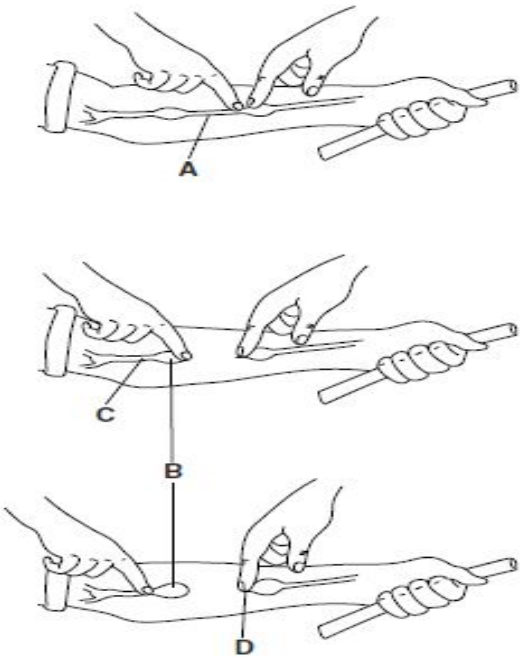
[4]

[Total: 10]

Transport in Human P2 questions

O/N13/22/Q1

Fig. 1.1 shows a demonstration related to blood circulation.



Both fingers are pressed firmly on blood vessel **A**.

Both fingers remain pressing on the blood vessel. The finger on the left is then drawn along the blood vessel and stops when it reaches **B**. It is then removed and replaced at **C**.

The finger on the right continues to press firmly on the blood vessel. The finger on the left is then pushed gently but firmly towards **B** which increases in size.

Fig. 1.1

(a) (i) Name the type of blood vessel labelled **A** in Fig. 1.1.

..... [1]

(ii) Name the structure leading to the effect shown in this blood vessel at position **B**.

..... [1]

(b) In the space below, draw a longitudinal section (cut along its length) through the blood vessel as it appears at position **B**.

[2]

(c) Suggest why, at the end of the demonstration, the blood vessel is no longer visible between positions **B** and **D**.

.....

.....

.....

.....

.....

.....

.....[4]

(d) Suggest why a rod was repeatedly gripped tightly before carrying out this demonstration.

.....

.....

.....

.....[2]

[Total: 10]

M/J13/22/Q4

Fig. 4.1 shows part of the circulatory system, and **some** of the structures associated with organ **B**.

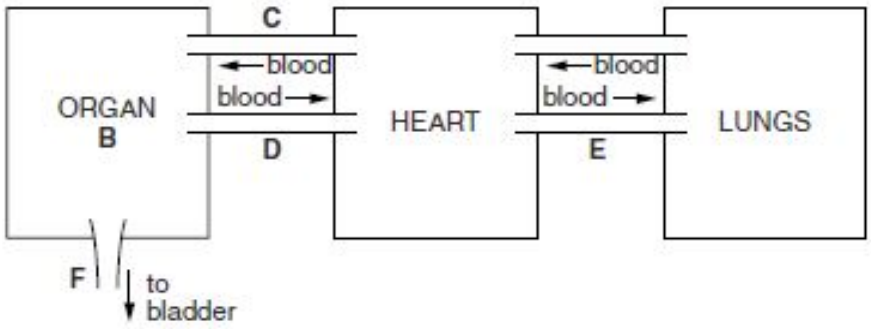


Fig. 4.1

(a) Name organ **B** in Fig. 4.1 ..... [1]

(b) **(i)** Name blood vessels **C** and **E** in Fig. 4.1.

C .....

E ..... [2]

(ii) Name the chambers of the heart, in the order in which blood passes through them from **D** to **E** in Fig. 4.1.

.... [2]

(c) Complete Table 4.1 to show **four** differences between the contents of **F** and the blood vessel, **C**, in a healthy person.

Table 4.1

difference	C	F
1		
2		
3		
4		

[4]

[Total: 9]

M/J13/22/Q9

(a) Describe the structure and functions of capillaries in the circulatory system.

.....

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.....

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.....

.....[5]

(b) Describe the functions of each of the following:

(i) white blood cells

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.....

.....

.....

.....

.....[3]

(ii) platelets.

.....

.....

.....

.....[2]

[Total: 10]

O/N12/21/Q8

(a) Explain what is meant by *double circulation*.

.....

.....

.....

..... [3]

(b) Describe the composition and the importance of plasma in the circulatory system.

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..... [7]

[Total: 10]

0/N12/22/Q4

Fig. 4.1 shows a person sitting on a chair with his legs crossed, watching the television. A friend notices that the person's foot is making very slight regular kicking movements as indicated by the arrow on Fig. 4.1.



Fig. 4.1

The friend times the movements with her watch and announces that the person's heart is beating 70 times per minute.

(a) (i) Explain how the friend was able to make this deduction.

.....

.....

.....

.....

.....[4]

(ii) Explain why the person's leg kicks at a faster rate when there is an exciting programme on the television.

.....

.....[1]

Fig. 4.2(a) shows a chair leaning against a wall, carefully balanced and with a scale pan hanging from the front of the seat. Fig. 4.2(b) shows what happens when a mass is then added to the scale.

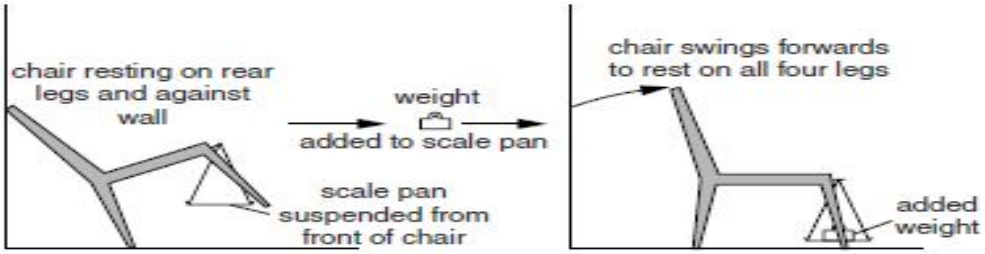


Fig. 4.2(a) **Fig. 4.2(b)**

A student sits in a chair, leaning against a wall as shown in Fig. 4.2(a), and **remains perfectly still**.

(b) Use your knowledge of how blood moves through the circulatory system to suggest an explanation for why, after a few minutes, the chair falls forwards similar to the chair in Fig. 4.2(b).

.....

.....

.....

.....

.....[4]

[Total: 9]

O/N11/22/Q7

Describe how blood is made to flow in a continuous circulation around the body with reference to

(a) the heart

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.....[4]

(b) the arteries

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.....[3]

(c) the veins

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.....[3]

[Total: 10]

Transport in Human P2 questions

M/J11/21/Q6

(a) With reference to the blood vessels involved, describe

- how the liver is supplied with the requirements for its functions
- how its products are taken away.

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.....[8]

(b) Explain the importance of capillaries in excretory organs.

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.....

.....[2]

[Total: 10]

O/N11/22/Q1

Fig. 1.1 shows a vertical section through a human heart. The valves have not been shown.

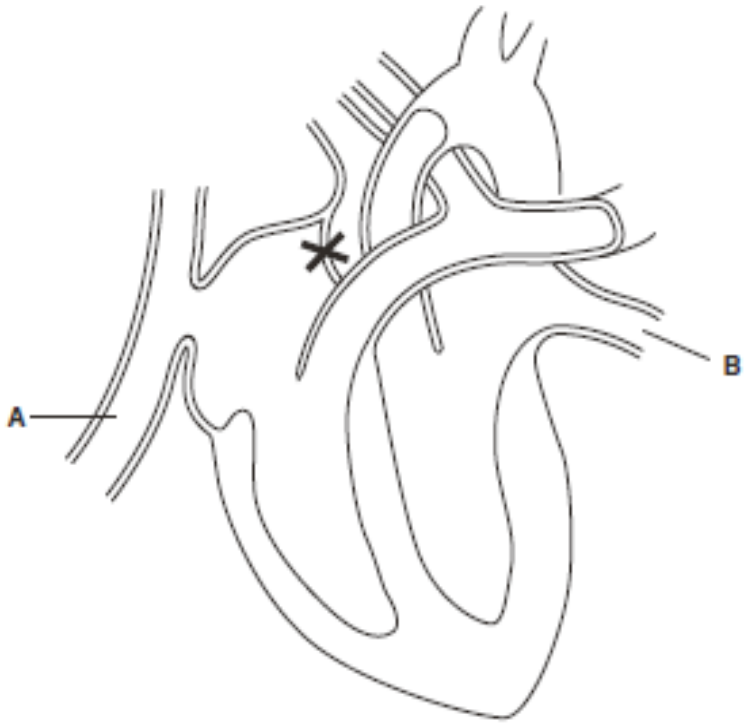


Fig. 1.1

(a) Identify structures **A** and **B** in Fig. 1.1.

A .....

B ..... [2]

(b) Complete Fig. 1.1 by drawing the valves to show how they control the direction of blood flow through the heart. [4]

(c) On Fig. 1.1, draw arrows to show the direction of blood flow into, through and out of the heart. [2]

Some people have a condition known as 'a hole in the heart'. This allows a connection between the left and right atrium at point **X** in Fig. 1.1.

(d) Suggest two problems this might cause.

1. .....

2. .....[2]

[Total: 10]

M/J11/22/Q8E

A person cuts their hand on a piece of glass that they are picking up from the ground.

(a) Describe how the body's defence mechanisms protect the person from infection.

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.....

..... [8]

(b) Explain how the person would know if the cut had damaged an artery.

.....

.....

..... [2]

[Total: 10]

Transport in Human P2 questions

Mark schemes will use these abbreviations:
; separates marking points
/ alternatives
() contents of brackets are not required but should be implied
R reject
A accept (for answers correctly cued by the question, or guidance for examiners)
AW alternative wording (where responses vary more than usual)
AVP alternative valid point (where a greater than usual variety of responses is expected)
ORA or reverse argument
underline actual word underlined must be used by candidate (grammatical variants excepted)
max indicates the maximum number of marks that can be given
+ statements on both sides of the + are needed for that mark

Transport in Human P2 questions

Mark Scheme

O/N18/22/Q1

1(a)(i) (Fig. 1) artery / arteriole / named artery ;

(Fig. 2) vein / venule / named vein ;

1(a)(ii) reference to size / shape

+ lumen AW ;

reference to size of wall / muscle / elastic ;

1(b)(i) two structures drawn toward lumen from similar height on opposite walls ;

all structures drawn point upwards ;

1(b)(ii) open / close OR action of valve flaps described ;

prevent back-flow of blood OR blood in one direction ;

from lower regions of body ;

low pressure ;

M/J18/21/Q4

4(a)
contain oxygenated blood contain deoxygenated blood
A + B + C ; D + E + F ;
2 A one or two correct letters in both boxes
for 1 mark in total
4(b)(i)
blood to or from the lungs blood to or from the body tissues
any two of **F + B + C ;**
three correct **F + B + C ;;**
any two of **A + D + E ;**
three correct **A + D + E ;;**
4
4(b)(ii) higher (to the body tissues) **AW ; 1**
4(b)(iii) left ventricle **;**
thicker **AW ;**
muscle **;**
greater **+** contraction / force (applied to blood) **AW ;**

Transport in Human P2 questions

M/J18/22/Q2

2(a)(i) coronary artery **; 1**
2(a)(ii) coronary heart disease / heart disease / CHD / atherosclerosis / cardiac disease / arteriosclerosis / angina **;**
1
2(a)(iii) **1** fat / oil / cholesterol **+** diet **AW ;**
2 stress **AW ;**
3 smoking **;**
4 genetics / inheritance **AW ;**
5 lack of exercise **;**
6 old age **;**
7 obesity **;**
3
A 'anxiety' / 'depression' for point **2**
2(a)(iv) **1** heart attack **AW** / heart stops / angina **AW** / breathlessness **;**
2 less blood **+** to body / tissues / organs or any named **;**
3 less oxygen/ glucose **+** to body / tissues / organs or any named **;**
4 less aerobic respiration **or** more anaerobic respiration **;**
5 production of lactic acid **;**
6 less ability **AW +** of heart to contract / pump blood **;**
7 less ability **AW +** to carry out physical activity **;**

2(b) *(inflating the balloon)*
1 opens metal mesh **AW ;**
2 push / compress **+** blockage / fat **;**
3 widen **AW +** blood vessel / lumen **AW ;**
(leaving the hollow metal mesh in the blood vessel)
4 maintain **AW +** wider lumen **AW ;**
5 increase **AW +** blood flow **;**

O/N17/21/Q4

4(a) red blood (cell) / erythrocyte **;**
oxygen **+** carriage / transport / absorption **AW ;**
2
4(b) tiredness / fatigue / weak / dizzy / faint **;**
inability to exercise / exert / inactive **;**
breathing problems **;**
reduced oxygen transport **;**
reduced respiration **;**
reduced energy (release) **;**
irregular menstruation **AW ;**
4
4(c) low water potential / concentration inside cell **;**
water enters **;**
by osmosis / diffusion **;**
cell expands **;**
cell bursts **;**
reference to no cell wall **;**

Transport in Human P2 questions

M/J17/21/Q3(a and b)

3(a) (**X**) liver **;**
(**P**) hepatic vein **;**
(**Q**) hepatic portal vein **;**
(**R**) hepatic artery **;**
4
3(b) (**P** / vein has) wide(r) **+** lumen **AW ;**
thin(ner) wall **;**
less **AW +** muscle / elastic (tissue) **;**

O/N16/21/Q8

8(a) through heart twice (during one circuit) **AW ;**
circuit **+** to lungs / pulmonary **;**
blood to become oxygenated / pick up oxygen **;**
blood to lose carbon dioxide **;**
circuit **+** to body tissues / systemic **;**
to deliver oxygen / glucose (to body tissues) **;**
collect carbon dioxide **;**
reference to part of heart **+** named vessel **;**
low pressure lungs / high pressure body **;**

8(b) one cell thick / thin / 1µm + wall **;**
small diameter of lumen / RBC single file / width of RBC
AW ;
no muscle / no elastic tissue (compared with
artery / vein) **;**
leaky walls **AW ;**
diffusion **;**
reference to named material **;**

O/N16/22/Q4

4(a)(i) Left Ventricle / helps blood flow or pressure **; 1**
4(a)(ii) muscle **; 1**
4(a)(iii) aorta **; 1**
4(b)(i) arrow in or towards heart in vena(e) cava(e) **;**
arrow towards heart in pulmonary vein(s) **;**
2 A only one vena cava / pulmonary vein annotated
R if arrows in these vessels contradict
4(b)(ii) arrow right to left through LVAssist Device / in tube M / N **; 1 R** if arrows contradict
4(c) aortic / semi-lunar **; 1**

4(d) right ventricle **;**
pulmonary artery **;**

O/N15/21/Q2

2 (a) X
right ventricle ;
pulmonary artery ;
Y
left ventricle ;
aorta ;
[4]
(b) (i) line decreases (lowest at capillaries) followed by increase ;
vein diameter drawn to be higher than artery ;
[2]
(ii) ref. heart / ventricle + pump / source of pressure ;
pressure relates to distance from heart / pump ;
resistance / friction ;
narrow lumen (in artery) ;
thick / muscular / elastic walls (in artery) ;
generation of tissue fluid in capillaries ;
[max. 4]
A arteries take blood from / are
close to heart
ORA for vein
(c) (i) valve ;
prevents backflow of blood / allows flow in one direction only ;
[2]

(ii) muscle(s) ;

contract ;

put pressure + wall of vein / blood in vein ;

[max. 2]

Transport in Human P2 questions

O/N15/21/Q8

8 1 red blood cells + transport / absorb / carry oxygen AW ;
2 no nucleus / biconcave / 'doughnut' shape AW + increased surface area ;
3 (oxy)haemoglobin ;
4 ref. (oxygen) diffusion into tissues / red blood cells ;
5 white blood cells / named + immunity / immune system / destroy pathogens / bacteria / viruses / named pathogen ;
6 phagocytes / phagocytosis ;
7 antibodies / anti-toxins ;
8 ref. tissue rejection ;
9 plasma + transport / carry ;
10 dissolved / in solution ;
11 two named chemicals transported ;
12 heat transported ;
13 platelets + blood clotting / plug hole ;
14 fibrinogen + to fibrin ;
[max 10]
A any three components named for 1 mark max. if no marks awarded for lack of accompanying explanations
I germs / foreign bodies
A urea, CO_2, vitamins, etc.

O/N15/22/Q3

3 (a) right ventricle ;
blood flows from right atrium to right ventricle / pressure increases ; [2]
A pressure increases with incorrect chamber for 1 mark
(b) increases when heart / ventricle + contracts / pumps ;
decreases when heart / ventricle + relaxes / doesn't pump ; [2]
A for 1 mark : ref. heart beat / pulse
(c) (i) capillaries / lung /alveoli / air sac / venule ; [1]
(ii) CO_2 lost * ;
O_2 gained / oxygenated * ;
haemoglobin / oxyhaemoglobin ;
change in pH / less acidic ;
ref. to diffusion gradient / concentration gradient ; [max 3]
*OR A gas exchange for 1 mark
(d) wider variations in pressure AW ;
pressure high(er) AW ;
left ventricle wall large / thick / more muscular ;
blood has further to travel / takes longer ;
more or many fluctuations / undulations AW ; [max 3]
I increasing pressure
[Total: 11]

Transport in Human P2 questions

O/N14/22/Q1

(a) (i) (dorsal) aorta ; [1]
(ii) left ventricle ; [1]
(b) (amino acids) 0.05 ;
(glucose) 0.10 to 0.15 ;
(mineral ions) 0.72 to 2.22 ;
(proteins) 8.00 ;
(urea) 0.03 to 2.03 ;
[5]
(c) B would contain some / more / high (glucose) / C would contain more / high (glucose) / D would contain more / high (glucose) ;
lack of Insulin ;
glucose would not be converted into glycogen ;
kidney unable to/doesn't reabsorb all glucose ;

O/N14/22/Q9

9 (a) blood goes through heart twice (in one complete circuit of the body) ;
circulation to / from lungs / pulmonary ;
circulation to / from (rest of) body / systemic ;
lungs + low pressure ;
body + high pressure ;
[max. 4]
(b) two sides to the heart / heart completely divided ;
four chambers / two atria + two ventricles / all 4 named chambers ;
beats continually ;
right side / atrium + receives blood from body ;
right side / ventricles + pumps blood to lungs ;
left side / atrium receives blood from lungs ;
left side / ventricle + pumps blood to (rest of) body ;
left ventricle thicker-walled / more muscular + than right ventricle ;
ventricles thicker-walled / more muscular + than atria ;
further to pump blood / generate higher pressure ;
ref. valves + one-way flow / prevent backflow ;
[max. 6]
[Total: 10]**M/J14/21/Q1**

1 (a) (i) red (blood cell) ;
absorb / carry / transport oxygen / transport CO_2 ;
[2]
R carry substances
Ig contain haemoglobin
(ii) thinner in middle / ref. biconcave ;
ref. haemoglobin ;
more (haemoglobin) at edges than at centre ;
light more easily able to pass through centre ;
lack of nucleus ;
[3]
(b) (i) B – white blood cell (phagocyte)
C – white blood cell (lymphocyte) ;
[1]

(b) (ii) problem:
reduced immunity / immune response / less able to fight infection / kill microorganisms or pathogens / more likely to suffer (infectious) disease* ;
explanation:
ref. phagocytosis ;
ref. antibody production ;
microorganisms / pathogens/bacteria/viruses / remain in blood / body / not destroyed ;
more likely to succumb to (infectious) disease* AW ;
[1]
[3]
A named diseases R leukaemia
A bacteria / virus / fungi Ig germs
Max. 3 for explanations.
* accept once only in either place
Total [10]

O/N13/22/Q1

1 (a) (i) vein; [1]
(ii) valve; [1]
(b) a valve shown with flaps touching;
vessel widest at correct side of valve + walls shown both before and after valve; [2]
(c) (vein) empty / no blood flowing through;
blood has been pushed out of (vein);
* blood cannot flow back (due to valve / from B);
* finger on the right / at D + prevents blood flowing;
walls of vein thin thus not visible beneath skin AW; [max 4]
(d) muscle + contraction(s);
increase blood pressure;
increases circulation / blood flow / helps fill (vein) with blood; [2]

M/J13/22/Q4

4 (a) kidney; 1
(b) (i) C – renal artery / aorta;
E – pulmonary artery; 2
No e.c.f. in this instance
(ii) right atrium/auricle; right ventricle; 2
(c)
C F
blood + urine;
(a named) cells / platelets /
plasma
+ no cells / platelets / plasma;
protein/antibodies
/ amino acids / fats
+ none;
lower urea concentration / higher urea concentration;
glucose + no glucose;
fewer salts / ions / less water / more / salts or ions / water;
more hormones / vitamins / fewer hormones / vitamins;
Max 4
Ignore refs. to O_2 / CO_2 waste products
Ignore minerals

Transport in Human P2 questions

M/J13/22/Q9

9 (a) 1. join arteries to veins;
2. walls + thin / one-cell thick / elastic;
3. allow passage of (tissue) fluid / plasma / permeable;
4. microscopic / pass easily between cells / large surface area / narrow lumen;
5. pressure reduction (along capillary);
6. ref. diffusion;
7. to / from + cells / tissues;
8. any 2 of the following:
(may be carried, passed in / out)
glucose,
amino acids,
oxygen,
CO_2 ,
hormones,
urea,
ions / salts, Max 5
(Ignore 'They are one cell thick')
(b) (i) (WBCs) phagocytes / phagocytosis or described ;
antibodies / antitoxins;
ref. bacteria / viruses / dead cells / pathogens / microorganisms / microbes;
immune response / rejection AW; Max 3
Ignore germs
A ref. immune system / immunity
(ii) (platelets) plug damaged vessels;
fibrinogen;
to fibrin;
clotting;
ref. antithrombin / prothrombin / thrombin / thromboplastin / thrombokinase; Max 2
R fibres

O/N12/21/Q8

8 (a) blood passes through heart twice;
lungs + to rest of body;
lower pressure in pulmonary circulation ORA;
correct ref oxygenated blood / deoxygenated blood; [max 3]
(b) water;
solvent / carries dissolved / in solution;
any two from:
for salts or ions / glucose /amino acids / vitamins / fat or fatty acids + glycerol;;
urea;
plasma or blood proteins or named;
hormones;
transport of blood cells / platelets;
heat;
carbon dioxide;
to service body cells / target organs; [max 7]
[Total:

O/N12/22/Q4

4 (a) (i) pulse (beat);
in artery in leg;
increased pressure;
ref. one pulse beat/kick for every heart beat; [Max 4]
(ii) adrenaline/heart beats faster; [1]
(b) blood + legs/feet;
in veins;
no use of leg muscles ;
blood not pushed from one set of valves to the next;
increases mass/weight of the (lower) leg; [Max 4]
[Total: 9]

O/N11/22/Q7

7 (a) valves;
prevent backflow;
muscular + contraction;
ventricles + thick walls / thick muscles / powerful contraction (A if there is ref. only to left ventricle);
pump / push / squeeze;
(creates) pressure in blood system;
never tires or suffers from cramp / rhythmic; [max 4]

(b) always carrying blood away from heart / under pressure;
thick walled;
muscular;
narrow lumen AW;
allows recoil / maintains pulse beat (A elasticity);
link to capillaries / veins; [max 3]
(c) return to heart / low pressure / large lumen;
have valves;
at intervals along their length;
prevent backflow;
thin-walled;
allows (skeletal) muscular contraction to ‘knead’ the blood AW (R ref. to muscular walls); [max 3]
[Total: 10]

Transport in Human P2 questions

M/J11/21/Q6

6 (a) hepatic artery;
carries oxygen;
hormones/insulin/adrenalin;
hepatic portal vein;
from gut/villi/small intestine;
glucose (A with ref to artery) R refs glucose – glycogen;
amino acids (A with ref to artery);
hepatic vein;
removes carbon dioxide;
urea;
any named other product of the liver; [max 8]
(b) thin walls/one cell thick;
allow diffusion;
short distance (to diffuse)/close to cells;
of urea/salts etc. into kidneys;
of carbon dioxide into alveoli/lungs;
oxygen to excretory tissues; [max 2]
[Total: 10]
7 (a) carbon dioxide A on equation;
combines with water A on equation;
during photosynthesis;
to make named carbohydrate/protein;
eaten by/passed to consumers/animals;
respiration;
in any 2 named groups of different types of organism;
releases carbon dioxide A with ref to combustion;
leaves decomposed/decay/ refs to methane/fossil fuels
A refs to decomposition in animals/faeces etc if phs mark scored; [max 7]
(b) another named requirement (CO_2/temperature);
in short supply AW;
use of syllabus term limiting factor; [3]
[Total:

O/N11/22/Q1

1 (a) A vena cava (*I* anterior / superior);
B pulmonary vein; [2]
(b) 2 sets of aortic valves shown;
2 sets of atrio-ventricular valves shown in correct places;
unattached end(s) of aortic valve(s) pointing upwards;
unattached end(s) of a-v valve(s) pointing downwards; [4]
(c) arrow(s) correctly into, through and out of right side of heart;
(i.e. look for evidence of all three sites)
arrow(s) correctly into, through and out of left side of the heart; [2]
(d) Any two (**mark the first, one per line unless a line is left blank) from:
mixing of blood, ref. possible effect on pressures of blood (but if stated, must be lower), ref. possible effect on volume of blood (leaving heart or one chamber), reduced oxygen carriage round the body, heart has to work harder, feeling tired AW, shortness of breath, fluid build-up, ;; [2]
(In fact, blood passes from left to right atrium – but do NOT penalise if wrong.)
[Total: 10]

M/J10/22/Q8E

8E (a) capillaries / blood vessels damaged ;
bleeding / blood flow ;
platelets / thrombokinase / prothrombin / thrombin ;
fibrinogen ;
fibrin ;
clotting ;
scab (or described) ;
new cell growth ;
re-establishment of bacteria-proofing / skin re-seals ;
white blood cells or named ;
antibodies / antitoxin ;
phagocytosis or described ; [8 max]
(b) bright red in colour / oxygenated blood ;
blood leaves in spurts / ref pulse in arteries ; [2]
(Ignore references to pressure)